

# FLIGHT

The  
AIRCRAFT  
ENGINEER  
&  
AIRSHIPS

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Founder and Editor : STANLEY SPOONER

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## Flight

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### "FLIGHT" PHOTOGRAPHS.

To those desirous of obtaining copies of "Flight" Photographs, these can be supplied, enlarged or otherwise, upon application to Photo. Department, 36, Great Queen Street, W.C.2

### DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list :—

1927

April 28	....	"Seaplane Design." Major R. E. Penny, before R.Ae.S.
May 10	....	Aero Golfing Soc. Match, Berkhamsted.
May 10	....	"Aerial Survey," Maj. H. Hemming, A.F.C., before Inst.Ae.E.
May 15	....	Hampshire Air Pageant, Southampton Aerodrome, Hamble.
May 19	....	Aero Golfing Soc. (FLIGHT Cup), Addington.
May 19	....	The Royal Tournament, Olympia
May 23	....	"Steels for Aircraft," Sir Robert Hadfield, Bart., before Inst.Ae.E.
May 25	....	Inst.Ae.E. Visit to the National Physical Laboratory, Teddington, Middlesex.
June 4	....	Inst.Ae.E. Visit to Croydon Aerodrome.
June 4-16	....	Fourth International Aero Exhibition, Prague.

### INDEX FOR VOL. XVIII.

The Index for Vol. xviii of "Flight" (January to December, 1926) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C.2. Price 1s. per copy (1s. 1d. post free).

### EDITORIAL COMMENT.



THE Annual Report on the Progress of Civil Aviation was published towards the end of last week, and a lengthy summary of it is given elsewhere in this week's issue of FLIGHT. Broadly speaking, this year's report follows those of previous years in its general arrangement, but it is pointed out that in future the period will be changed from covering the financial year, as at present, to correspond with the calendar year. Consequently, this year's report covers the period from April to December, 1926, and the 1927 report will deal with the 12 months from January 1 to December 31, 1927.

An examination of the statistical tables contained in the report shows that there has, as far as Imperial Airways are concerned, been a steady increase in the air traffic. Thus, the "horse-power-miles" (the new "unit" chosen as a subsidy basis) for 1926 were 549,139,440, as compared with 421,154,575 the previous year. The figures for passenger miles were 3,746,095 and 2,645,275 respectively, and for goods ton-miles 159,030.74 and 147,566.96, respectively. The figures for passenger ton-miles were : 334,532.04 and 236,185.25 respectively. It will thus be seen that there has been a steady increase in the traffic under all heads.

During 1926, a total of 15,450 passengers was carried in 2,879 flights between Great Britain and the Continent by British aircraft, or an average of just under six passengers per flight. The second highest number of passengers were carried by French aircraft, amounting to 6,368 in 1,517 flights, or an average of just over four passengers per flight. The use by Imperial Airways of large three-engined

machines is probably reflected in these figures. Out of the total number of passengers carried between Great Britain and the Continent, British machines carried 61 per cent., and of the total number of flights made, 52 per cent. were by British aircraft. In view of the fact that three nationalities operate the routes out of Croydon, these figures can probably be regarded as satisfactory.

A steady increase is also to be recorded for the value of goods imported into and exported from the United Kingdom, as well as an increase in the value of bullion and gold and silver coin imported, although there is a decrease in the value of gold, &c., exported by air to other countries.

Although not "commercial" aviation, the work done by the Light Aeroplane Clubs is highly important, and statistics given show that all six clubs have done well and have put in some hard work, Club machines having made 10,652 flights in 4,358 hours.

One welcome change is found in this latest Report on Civil Aviation.

Whereas previously it was the custom to state the efficiency of the air services as proportion of flights completed to flights commenced, the present report makes use of the much more logical and informative method of stating the efficiency as proportion of flights completed to number of flights scheduled. This basis has been advocated in *FLIGHT* for several years, for the reason that, as we have repeatedly pointed out, by refusing to start under any but perfect conditions, it is relatively easy to make a showing of 100 per cent. efficiency, although such a service might be of little practical value.

On the new basis, the scheduled services have, it seems to us, done remarkably well. For instance, during 1926 a total number of 4,374 flights was scheduled, out of which 374 only were cancelled. Of the remaining 4,000 flights commenced, 3,715 were completed without interruption, 239 were completed after interruption, and only 46 flights were interrupted and not completed. In other words, 85 per cent. of scheduled flights were completed without interruption, and 90 per cent. were completed, either with or without interruption. That, we submit, is a record of which Imperial Airways may be justly proud. The figures for 1925 were 74 per cent. and 80 per cent. respectively, so that there has been a very substantial increase in the efficiency of the services during 1926. Out of the flights commenced during 1926, 93 per cent. were completed without interruption, and no less than 99 per cent. were completed either with or without interruption. This means, in other words, that if a passenger "emplanes" on a British machine which starts its flight, his chances of reaching his destination without interruption are 93 in 100, while his chances of getting through, even if after an interruption are 99 in 100.

These two sets of figures, *i.e.*, percentage of flights made out of those scheduled, and flights completed out of those started, show respectively what may be called the commercial reliability and the safety of air transport. The former is mainly of interest to the prospective user of the air lines who will ask himself: "If I do make use of the air service, what are the chances that the scheduled service will be adhered to?" On last year's figures, the answer to that is, "85 in a hundred." The second

set of figures are, perhaps, of more interest to the man who wishes to make personal use of the airways, and who will desire to know what chances he has of getting through if he starts on a flight to the Continent, or to London from the Continent. Again the answer is reassuring, and altogether the efficiency figures of the 1926 report are very gratifying. That we shall ultimately reach 100 per cent. efficiency, at any rate as regards percentage of scheduled flights completed with or without interruption, is not too much to hope, and it would appear probable that at any rate one reason for the good results obtained is to be found in the use of modern three-engined machines.

### Safety

From the point of view of safety, the year has been, as regards the regular subsidised air lines, slightly marred by a mishap which befell one of the cross-Channel machines. Fortunately, the results were not serious to the passengers, who escaped with a cold wetting in the Channel, but the point is that even this mishap, relatively trivial as it was, should not have happened. There was no necessity for it happening, and it is pretty certain that there will be no repetition. Thus, prospective passengers on the British air lines to the Continent can be reasonably sure that whatever befalls them, they will not be dumped in the Channel. Last year's mishap may have scared away a few, but although we hold that this mishap ought not to have taken place, we are, as already stated, equally sure that nothing of the sort is likely to happen again.

Apart from this one instance (which had no serious consequences), it is gratifying to be able to place on record the fact that not a single accident resulting in injury or death to passengers took place on the regular British subsidised air routes. In view of the fact that during the period under review the machines of Imperial Airways covered a mileage of 732,980 miles, or, put in another way, completed a "horse-power-mileage" of 549,139,440, this record is one which reflects credit not only on the operating company and its personnel, but also on the aircraft and aero engine manufacturers, whose products have made such a record possible. Altogether, as regards safety and reliability of British services, the report gives cause for satisfaction.

### Foreign C.A.

If the statistics contained in the report are satisfactory from the safety and reliability point of view, as applied to British lines, they are a little less so when compared with the figures of other nations, at any rate judged on the basis of the amount of traffic. How the British lines compare with foreign in the matter of safety and reliability is a little difficult to determine, but it seems fair to assume that our record is not likely to suffer by comparison with any foreign lines. The volume of traffic, however, is rather another story, and there British air services do not shine particularly. France and Germany especially, are forging ahead, and are piling up mileages and passenger miles at a rate which is somewhat alarming. Space does not permit of going into details this week, but in next week's issue we hope to give some comparative statistics, which we believe may come as somewhat of a surprise to many of our readers.

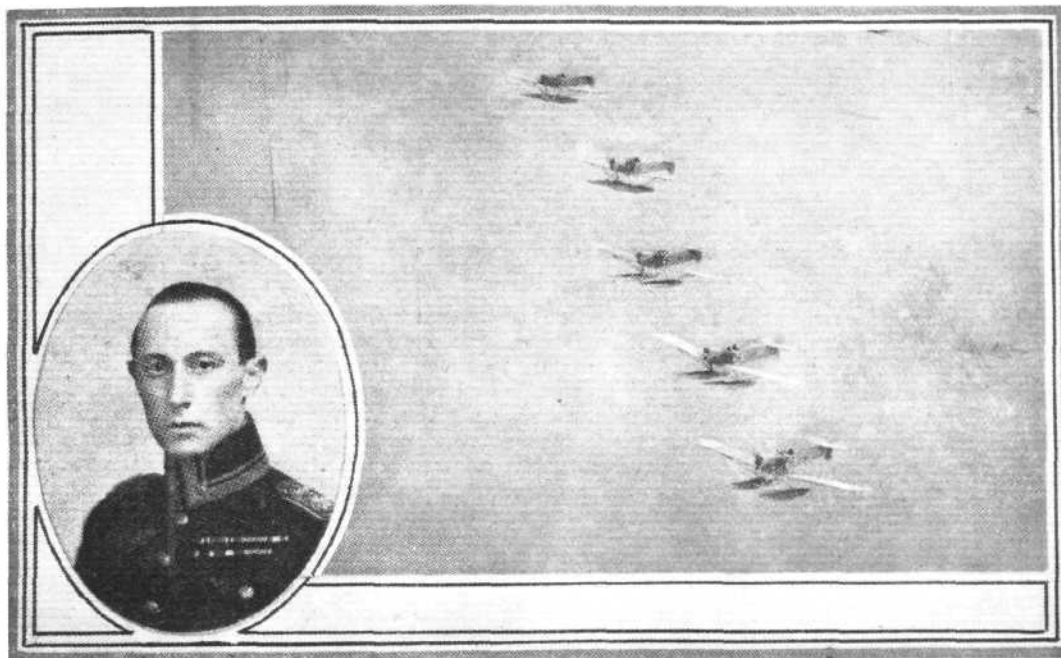
# AN AIR PAGEANT ON THE ICE

## Finland's Unusual Display

ON March 25 a most interesting aerial demonstration took place in Finland, consisting of an air pageant on the ice at Helsingfors, an event probably unique in the history of aviation.

The pageant was arranged more or less on the lines of the

In the summer the skis are replaced by wheels, and many of the machines are sent to the nearest land aerodrome about 100 km. inland, although a number of the machines have the skis changed to floats and continue to use the hangars at Sandhamn (5 km. from Helsingfors).



A "Finnished" formation: Five machines of the I.V.L. A22 type photographed from the air. Inset, Col. Vuori, Chief of the Finnish Air Force.

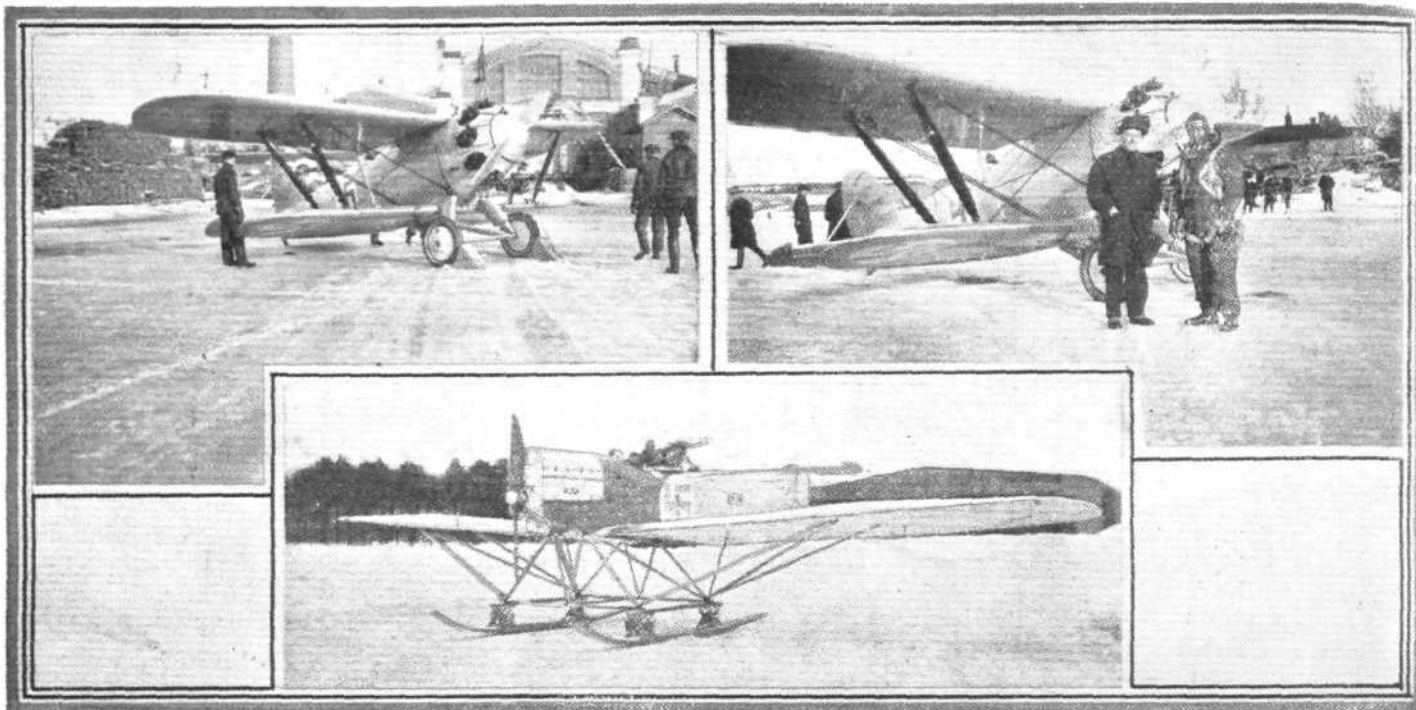
annual display by the R.A.F. at Hendon, and it was held in the month of March owing to the fact that in the summer there is no land aerodrome near Helsingfors, whereas in the winter the Finnish Air Force have a magnificent aerodrome available consisting of the frozen sea around Helsingfors.

During the preceding days great activity was displayed by the energetic "Society of Aerial Defence in Finland"; large posters were shown all over the city of Helsingfors, processions went through the streets depicting the evolution of methods of transport, bands played in the city, notices



A FINNISH AIR PAGEANT: This photograph shows the crowds assembled to witness the first Air Display held at Helsingfors on March 25. The machines were fitted with skis so as to enable them to use the ice as an aerodrome.





**FINNISH AIRCRAFT:** Above, two views of a fighter designed and built in Finland, and fitted with a Gnome-Rhone "Jupiter" engine. With the pilot in the photograph on the right is Mr. Berger, the designer of the machine. The lower photograph shows another Finnish machine of pronounced Brandenburg appearance, known as the I.V.L. A22.

were shown in the cinemas, firework displays took place, machines flew over the city by night and day, flags were sold by the Society of Aerial Defence, lectures were given on the wireless, and, generally speaking, it was made impossible for the good citizens of Helsingfors to be oblivious of the fact that something connected with aviation was taking place in their city that week.

The pageant itself was favoured by a beautiful sunny day with a temperature well below freezing, and was watched by a very large crowd indeed.

The Air Force organization was as near perfect as possible, and all the events took place to time and without a single hitch. The programme was as follows:—

1. Fly past of different types of machines.
2. Formation flying.
3. Aerobatics.
4. Parachute descents.
5. Raising a smoke screen.
6. Destruction of balloons.
7. Aerial fighting.
8. Destruction of a village.
9. Passenger flights.

To an observer from England the three outstanding items were the two "live" parachute descents on to the ice, the destruction of the village (by Martinsyde machines), and the super-excellence of the formation flying of the Finnish pilots.

A most realistic village was constructed on the ice, and the Martinsyde machines dived at it amidst the rattle of machine gun fire and to the accompaniment of bursting bombs in the approved Hendon fashion.

The chief credit for the all-round excellence of the pageant (when not even a tail skid was damaged) and for the very high standard of efficiency in the Finnish Air Force, must go to the commanding officer, Col. V. Vuori. Col. Vuori has been in England and has visited many Air Force stations and aircraft works; he is a first-class pilot himself and is possessed of a most attractive personality.

Col. Solin is another high Finnish officer who has also visited England, and who has been largely concerned in the development of the Finnish Air Force.

Nor must one omit to mention Sqdn.-Leader Field, who has been loaned to Finland by the Air Ministry to assist in the instruction of the Finnish pilots, and who has already spent two years in Finland, speaks Finnish, and is extremely popular in Helsingfors and with the officers of the Finnish Air Force.

The Finnish National Aircraft Factory has recently produced a fast single-seater fighter equipped with a "Jupiter" engine, and embodying all the latest ideas in aircraft design. The designer is Mr. Berger, who has spent some time studying in England. This machine had only been flown four times, but gives excellent promise of fulfilling all the requirements of a fast fighting scout well up to present-day standards.

In conclusion, it can be said that the Finnish Air Force, under Col. Vuori, has reached a very high standard of discipline, organization and efficiency, and, in addition, the amount of flying done by the pilots is very considerable. Except as regards size, the Finnish Air Force has no reason to fear comparison with any other Air Force in the world.



#### Cranwell Cadet College Magazine

THE R.A.F. Cadet College at Cranwell have just published their Spring volume of the College Magazine in half-yearly form. It contains some excellent photographs to illustrate the various articles and stories as well as several maps. All local matter is fully detailed, which must therefore contain personal interest to all sections of this great training centre. There is much to be said for a half-yearly magazine like this as against the usual monthly publication, as it allows for a better and more costly production and time for a discrimination of the matter and choice of the best contents. This Spring number is a worthy journal for such a prominent unit of the R.A.F.

#### Zeebrugge and Ostend Operations Re-union Dinner

At the re-union dinner of officers who took part in the operations at the Zeebrugge and Ostend harbours, on April 23 and May 10, 1918, which was held at the Café Royal on

April 23, at which Captain A. F. B. Carpenter, V.C., R.N., presided, were the following R.A.F. officers:—Air Vice-Marshal C. L. Lambe, Air-Commodore F. C. Halahan, Squadron-Leader R. Graham, Captain H. A. Furniss, Flight-Lieut. F. H. Hudson, Lieut. A. L. Godfrey, and Lieut. L. H. Pearson.

#### Privately-Owned Aircraft

IN our issue of FLIGHT for April 14 we published a list of the aeroplanes privately owned and registered in Great Britain, as far as possible complete and up-to-date. No doubt some of our readers have noticed the absence from this list of the names of Mr. Alan Butler and Capt. G. de Havilland. As a matter of fact, both these gentlemen are private owners, but their names were missed in our list because their machines are registered under the name of the de Havilland Co., and we were thus unable to distinguish them from the other "commercial" aircraft.

# SPEEDS AT THE BOURNEMOUTH MEETING

## Some Interesting Comparisons

THE two tables published in last week's issue of FLIGHT, giving lap times and average speeds in events of the various competitors, have been much appreciated by our readers, and it is thought that a slightly more concise table of some of the machines competing may be of interest, even if the Bournemouth meeting is now a thing of the past. In the accompanying table we have compiled the average speeds, speeds in the fastest lap, and a ratio of fastest lap speed to average speed, for those machines particularly interesting to the private owner and the light 'plane clubs, namely, the two Westland "Widgeons," the Avro "Avians," and the de Havilland "Moths."

In the table the machines have been arranged according to highest average speed, the figure for this being the mean of the speeds in the number of events completed (and for which, therefore, speeds were available). The table is so arranged that not only is the average speed easily found for any given machine, but the number of events com-

merit " (nasty people might call it "figure of honesty"! ) is thus the best attained. His average speed was 84.8 m.p.h., and his fastest lap was covered at a speed of 86.5 m.p.h., or less than 2 m.p.h. faster than the average.

Four machines had only a slightly higher figure, namely 1.03. These were the "Avian" G-EBQN, Broad's "Moth," G-EBNO, the Blackburn "Bluebird," G-EBKD, flown by Longton, and another "Moth," G-EBNX, belonging to Mr. L. le Roy Irvin. This machine, however, completed but three events, and so the figures may be a little misleading. Mr. Hinkler's "Avian" shows the greatest difference between average speed and top speed, the fastest lap being covered at a speed 1.11 times greater than the average speed.

Special reference should be made, in this connection, to Lady Bailey's "Moth," G-EBPU, which is shown with a figure of 1.07, the average speed of this machine in five completed events being 82.8, while the fastest lap is 89 m.p.h. This was the second lap in event No. 5 of the Satur-

## SOME MORE FIGURES FROM THE BOURNEMOUTH MEETING

	Westland "Widgeon II" Armst.-Sid. "Genet" JT	Westland "Widgeon III" "Cirrus II" PW	Avro "Avian" "Cirrus II" QN	D.H. "Moth X" "Cirrus II" QH	Avro "Avian" "Cirrus II" QL	D.H. "Moth" "Cirrus II" NO	Avro "Avian" "Cirrus II" OV	D.H. "Moth" Armst.-Sid. "Genet" OU	Blackburn "Bluebird" Armst.-Sid. "Genet" KD	D.H. "Moth" "Cirrus II" PG	D.H. "Moth" "Cirrus II" PU	D.H. "Moth" "Cirrus II" NX
Speeds in completed Events	93.5	87.5	88.0	86.0	84.5	84.5	80.5	85.0	83.5	80.5	80.5	80.0
	94.5	91.5	89.5	83.0	85.5	84.0	85.5	84.5	83.5	82.0	81.5	82.2
	96.0	94.5	89.5	87.5	86.2	85.5	85.5	84.5	81.2	83.0	84.5	83.0
	88.0	95.0	89.5	89.7	87.0	86.2	87.2	85.7	84.2	83.5	84.5	—
	96.0	94.5	90.0	90.5	87.0	86.2	89.0	84.7	84.0	83.5	83.0	—
	—	—	90.0	91.5	—	86.0	90.0	—	—	84.2	—	—
	—	—	89.5	—	—	87.0	88.0	—	—	85.2	—	—
	—	—	—	—	—	—	93.0	—	—	—	—	—
(a) Average speed	93.6	92.6	89.4	88.0	85.9	85.6	84.8	84.8	83.3	83.1	82.8	81.7
(b) Fastest lap	97.2	96.8	92.3	92.3	91.0	88.8	94.4	86.5	85.5	86.5	89.0	84.0
(b)/(a)	1.04	1.05	1.03	1.05	1.05	1.03	1.11	1.02	1.03	1.04	1.07	1.03

pleted by each machine is clearly brought out. Bert Hinkler's "Avian," G-EBOV, heads the list in this respect, with eight events completed. Another "Avian," G-EBQN, and a "Moth," G-EBPG, are next, with seven events completed, and then the rest follow, with various numbers of completed events to their credit.

Another thing very clearly brought out by the table is the way in which speeds crept up during the meeting. As explained last week, this was partly due to a gradual improvement in the weather, which was windy on Good Friday, slightly less so on the Saturday, with almost a flat calm towards the evening of the Easter Monday. Nevertheless, the steady increase in speeds is not in all cases accounted for entirely by this change in the weather, and must be put down to some of the pilots "nursing" their engines a little during the first two days. It seems fair to assume that where the average speed of a machine and the speed on the fastest lap are most nearly equal, the machine was flown most nearly "all out" throughout the meeting.

The lowest ratio of highest speed to average speed was attained by Col. the Master of Sempill, whose "figure of

day's flying, the Bournemouth and District Business Houses Handicap, Heat 2. This lap was shown in last week's tables to have been covered in 3 mins. 22 secs. flying time, whereas the other three laps were covered in 3 mins. 42 secs., 3 mins. 35 secs., and 3 mins. 37 secs. respectively. It is just possible that this lap time may be wrong, and that it should have been 32 secs. instead of 22 secs. In that case the ratio of top speed to average speed would be 85.0/82.8 or 1.03.

The table gives a fairly good indication of the speeds of which the various machines are capable around a triangular course, but the straight-line speed would, of course, be somewhat higher. Exactly how much higher is difficult to say, but probably one would not be very far wrong if one assumed the absolute top speed in still air to be in the neighbourhood of 10 miles per hour greater for all machines. Admittedly there is no theoretical justification for this particular "flat rate," but a knowledge of the speeds of some of the machines, coupled with the fact that the slower aeroplanes are affected by wind to a greater extent than are the faster ones, indicates that as a rough and ready guide one would probably be very near the mark by making this assumption.

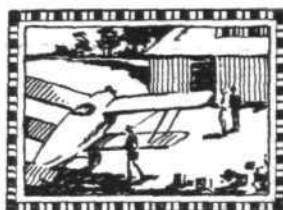
## "Aerial Survey"

WE would remind our readers that Major H. Hemming, A.C., A.F.R.Ae.S., etc., is reading a paper on "Aerial Survey" before the Institution of Aeronautical Engineers on

May 10. The paper will be illustrated by lantern slides, and the meeting takes place at 6.30 p.m. in the Lecture Room of the Junior Institution of Engineers, 39, Victoria Street, S.W.1.



# PRIVATE



# FLYING

A Section of FLIGHT in the Interests of the Private Owner, Owner-Pilot, and Club Member

## A DIVERSION ON INSURANCE

WE cannot presume that an article on insurance can by any stretch of the imagination be regarded as thrilling or even interesting reading to such an active mentality as that of a private flier's, or, as far as that goes, we don't presume that anybody is absorbingly interested in it except when a substantial claim is due. The exceptions, we naturally suppose, are the insurance companies, but even then we cannot believe that when they write up their prospectuses they regard their work as an addition to entertaining literature. However, we have to take our medicine in life, and after all it is usually for our good, although we don't suggest that before you take a sweet you should always take a pill. It can be pointed out that if we urge the strict attention of the private flier to matters of insurance when a machine is bought we are secretly suggesting that he at once urgently needs it, or in other words we are declaring that flying is dangerous. But we are not; we are merely ambiguous: we have something up our sleeve when we advise him to insure at once. We are perfectly well aware that flying is safe because does not everyone who utters wisdom and profound judgments on flying always begin by declaring that flying is as safe as houses?

However, if we are not urging insurance for the sake of a private flier's self-preservation because we know that he does not want it, say, as much as a motor-car driver or a pedestrian, we are urging it for a far more important form of self-preservation—and that is his pocket. The one item is of far more concern to him than the other. If a man gets killed he is done for (strange to say) as far as he is interested in his affairs, but if his means are threatened he will find himself very much interested not to say alarmed. Now this is a round-about way of warning a private flier that if he is not insured, in the thrilling event of him running into an admiring but otherwise innocent spectator and chewing him up to small pieces or falling on top of him and flattening him out on the face of the earth he is liable, according to an irrevocable law, to do everything humanly possible by way of compensation, short of bringing his victim back to life again. And if his victim is valued at a sum equal to all that his murderer possesses, the poignant question of the future prosperity arises.

Now the attitude of the insurance companies towards aviation is naturally a greater criterion of its safety than, perhaps, anything else, and it is therefore interesting to know for instance, that the British Aviation Insurance Group, of which Captain Lamplugh is the aviation expert, regard flying as comparatively safe to motoring, and that the reason for the high insurance rates in face of this is because of the much higher costs of aircraft repairs. An aeroplane is so fragile and, again in comparison with cars, it is almost no exaggeration to say that it cannot suffer the slightest ill-usage on the ground which does not involve extensive repairs. Take the case of a wing-tip slightly colliding with an object. In most cases it means hours of work ripping off the fabric to investigate the internal damage and sewing it on again afterwards, perhaps a rib is smashed, whilst if the ends of the spars are damaged, which is practically inevitable when a wing-tip is involved, a new wing is probably the cheapest means of overcoming such trivial mishaps. It is hardly necessary to point out that a similar small accident with a car means, perhaps, bending a mudguard into shape at the most. Finally, when any repair has been done to an aeroplane it has to be submitted to a highly technical inspection, which costs much money.

The rates of the B.A.I.G. mentioned above, who are more or less the only market for aviation insurance, are about 15 to 17½ per cent. per annum of the value of the machine, and this covers all damage to the machine when flying or taxi-ing and also ground risks. It is impossible, however, to pick out certain types of light aeroplanes which we know owners possess and tell them the exact cost of insuring them, because there is no standardization of rates in the present stage of private flying. All sorts of conditions govern the charges which, therefore, vary practically in all policies. For instance, the ability and experience of a pilot is taken into account by

the company, as well as the type of machine he owns and the way in which he maintains it and stores it. If a machine is cared for in a manner that asks for trouble the insurance companies naturally make him pay for his carelessness, and if the opposite is the case, the owner reaps his reward. The stronger the construction of the machine the less it costs to insure.

It has to be subjected to a thorough technical investigation both of its design and construction by the company's experts in spite of the fact that it already possesses an airworthy certificate, for this merely gives a guarantee of its safety and not of its degree of resistance to damage in a crash, which is very important from the insurance point of view.

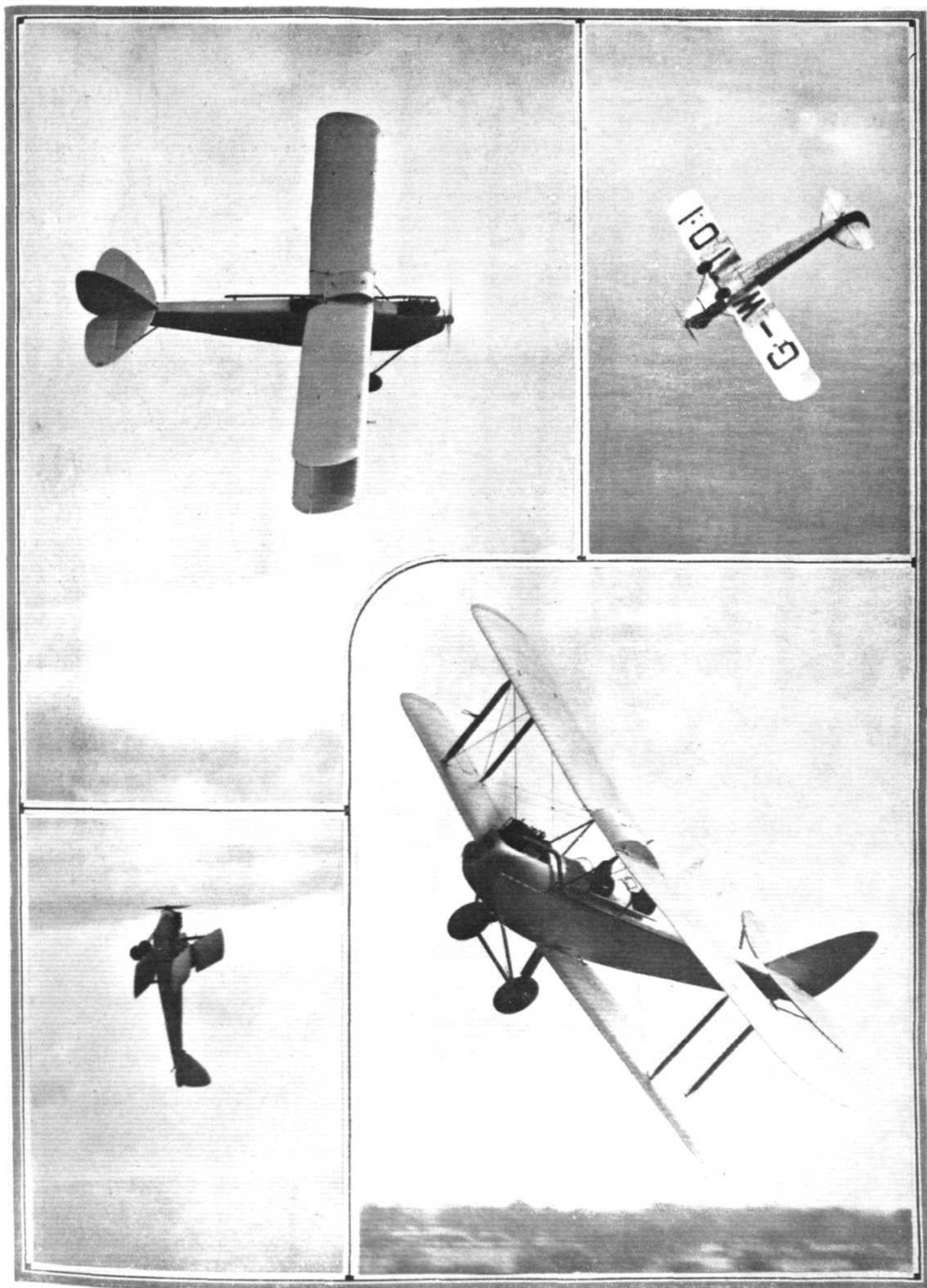
An essential fact to grasp is that the price of the machine upon which the percentage of 15 to 17½ is based is not the price at which it was purchased but the maximum cost which would be incurred in the case of a complete reconstruction after a crash. That is only natural, because whether a machine was purchased second-hand for say, £200, or new for £700 the cost of repairs would still be the same to an insurance company.

The next item in this lengthening jargon on self-preservation concerns third-party risks. A third party, as we have explained before, is not yourself but someone more dangerous. It is he who gets in your way when you are flying and puts you to as much trouble as he puts himself to only not of the same kind. The insurance costs between £20 and £30 per annum and covers you for a £1000, which ought to cover the real value of anybody who steps in the way of an aeroplane.

The precautions that are imposed by the insurance agreements are the same as those imposed by the clubs upon their members and also the official air regulations, which we have rashly promised to explain sometime in this feature. It is essential to possess the airworthy certificate and "A" licence. In the case of an accident nothing must be done without first sending a wire to the company and awaiting their instructions and, perhaps, inspection of the remains. On no account must anything be moved or repairs attempted unless you judge their costs to be less than £25, which you will never judge unless you happen to be an aircraft manufacturer.

It should be understood how insurance eliminates all the bother of dealing with the reaction after a crash as far as the machine is concerned. The company takes absolute possession of your machine and eventually restores it completely ready to fly again; that is to say that no matter where you crash they take charge of all the transportation to an aircraft factory, have the repairs executed and thoroughly examined afterwards, and then finally tested by an experienced test-pilot and delivered to you. Nothing could be more harmonious and it is positively worth far more than it actually costs you. Another advantage is the practical assistance that is always at your service when touring. Supposing when touring the Continent somebody gets obnoxious and wants to prove you guilty of some civic offence because he cannot understand your registration marks you have no need to knock him down yourself. Send a wire to the insurance company and they will immediately instruct their local representative to come and do it for you. This is an admirable clause in your policy and one that should always be remembered when you are landing say, in darkest Africa. The cost of personal insurance for a private flier does confirm the favourable view of the safety of flying held by the insurance company. It is only 3 per cent. per annum of the sum insured and it covers death and accidents. This works out at a much lower rate than that charged to racing motorists; which it ought to do, for the mantle of intrepidity has passed to him from the airman in these days.

We have to conclude with an inglorious retreat by informing women owner-pilots that the insurance companies do not take such a favourable view of their ability as they do of men's, and the rates are consequently much higher. But as a compensatory relief we would merely remind them of their favour with the Directorate of Civil Aviation.



[ " FLIGHT " Photographs ]

A DE HAVILLAND "MOTH" FOR GERMANY: At last Germany has fallen under the spell of the "Moth," and, owing to the generosity of Herr Carl Bercowitz, the Deutscher Sportflieger Club of Berlin has obtained one of these machines, which was delivered by Capt. Broad on Saturday last. Our photographs show the "Moth" in various attitudes. In the top right-hand picture, taken during a loop, the "trade" registration letters should be noted. In the lower left-hand corner the "Moth" appears to be looking for a candle.



## LIGHT 'PLANE CLUBS

### London Aeroplane Club

The total flying time for the week ending April 17 was 36 hrs. 10 mins. **Dual Instruction.**—G. Black, E. J. B. King, G. M. Randall, E. T. Symmonds, Dr. Cook, M. P. Susman, L. C. Davey, B. B. Tucker, I. H. McClure, I. Rich, A. J. Richardson, H. M. Samuelson, R. Drysdale Smith, A. C. Horton, H. Spooner, J. G. Crammond, Miss O'Brien, Lord Clydesdale.

**Solo Flying.**—G. M. Randall, J. H. Saffery, E. D. Moss, M. L. Bramson, E. S. Brough, C. A. Rogers, A. C. Pearson, Miss O'Brien, O. J. Tapper, H. Spooner, I. C. Horton, R. Malcolm, W. Beckett, C. R. Campkin, T. W. G. Eady.

**Passenger Flights.**—H. G. Riches, L. C. Davey, G. Lambert, Mrs. King, Mrs. Black, Miss Wilson, Miss Morris, G. H. Saxon Mills.

The total flying time for the week ending April 24 was 24 hrs. 20 mins.

**Dual Instruction.**—E. T. Symmonds, I. H. McClure, H. M. Samuelson, L. C. Davey, H. S. Greenland, M. P. Susman, A. J. Richardson, J. J. Hofer, A. J. Mulder, E. J. B. King, G. Black, Miss O'Brien, D. H. P. Esler.

**Solo Flying.**—O. J. Tapper, A. C. Pearson, Miss O'Brien, A. C. Horton, D. H. P. Esler, H. Spooner, J. J. Hofer, K. V. Wright, Major K. M. Beaumont, D. S. O., J. H. Saffery, G. Terrell, A. R. Ogston.

**Passenger Flights.**—A. D. Wilson, Miss Wilson, H. Percy, T. E. Miller, B. Merry, G. H. Saxon Mills, G. C. Bonner, L. H. Whiteside.

**Bournemouth Easter Meeting.**—The total flying time in connection with the Easter Races, including the flights to and from Bournemouth, was 26 hrs. 50 mins.

The Club was successful in three events, Miss O'Brien and Capt. H. Spooner winning two open races, and Capt. F. G. M. Sparks the Club Instructors Race. The total stakes won by the Club was £85.

The three Club machines were racing continually throughout the Meeting, and great credit is due to Capt. F. G. M. Sparks and the Ground Engineer, W. Moss, for the excellent condition in which the machines were turned out for each race. The several Members who piloted the machines also rendered valuable help in this direction.

**Burnt Oak Station.**—Burnt Oak Station, on the Hampstead Tube, is now open on Sundays. This station is within five minutes' walk of the aerodrome.

**Hampshire Pageant.**—The Club will be represented at the Hampshire Pageant, on May 15, by one D.H. "Moth" and the "Bristol" Brownie. The selection of the pilots will be made later.

### The Hampshire Aeroplane Club

REPORT for week ending April 22.

As reported in this paper last week, our sole remaining Moth was deleted at Bournemouth, but thanks to the kindly assistance of Mr. R. J. Parrot, an Avro Avian was acquired by the club on Tuesday, so that instruction was not interfered with.

However, gales have prevailed nearly every day since, so that our total

flying time for the week was only 5 hrs. 5 mins., which included our flying at Bournemouth on Saturday and Monday. Four members availed themselves of the opportunity of handling the Avian in the air—they were Bound, Bowen, Cox and Wyllie.

### The Lancashire Aero Club

REPORT for week ending April 23.—Very rough weather impeded aviation towards the end of the week. Total flying time, 56 hrs. 10 mins., made up as follows:—

Dual with Mr. Brown:—Messrs. Ward, 1 hr. 35 mins.; Fallon, 1 hr. 25 mins.; Hindley, 1 hr. 10 mins.; Torres, 1 hr.; Cohen, 45 mins.; Ruddy, Shiers, Jenkinson, Caldecott, and Miss Baerlein, 40 mins. each; Anderson, 35 mins.; Meades, 25 mins.; Leeming, Kearns, Chapman, Evans, Miss Brown and Miss Emery, 20 mins. each; Crosthwaite, Crabtree, Gattrell and Dobson, 15 mins. each. Dual with Mr. Cantrill:—Messrs. Goodyear, 1 hr. 5 mins.; Leeming, 10 mins. Dual with Mr. Scholes:—Mr. Twemlow, 7 hrs. 5 mins (navigation instruction).

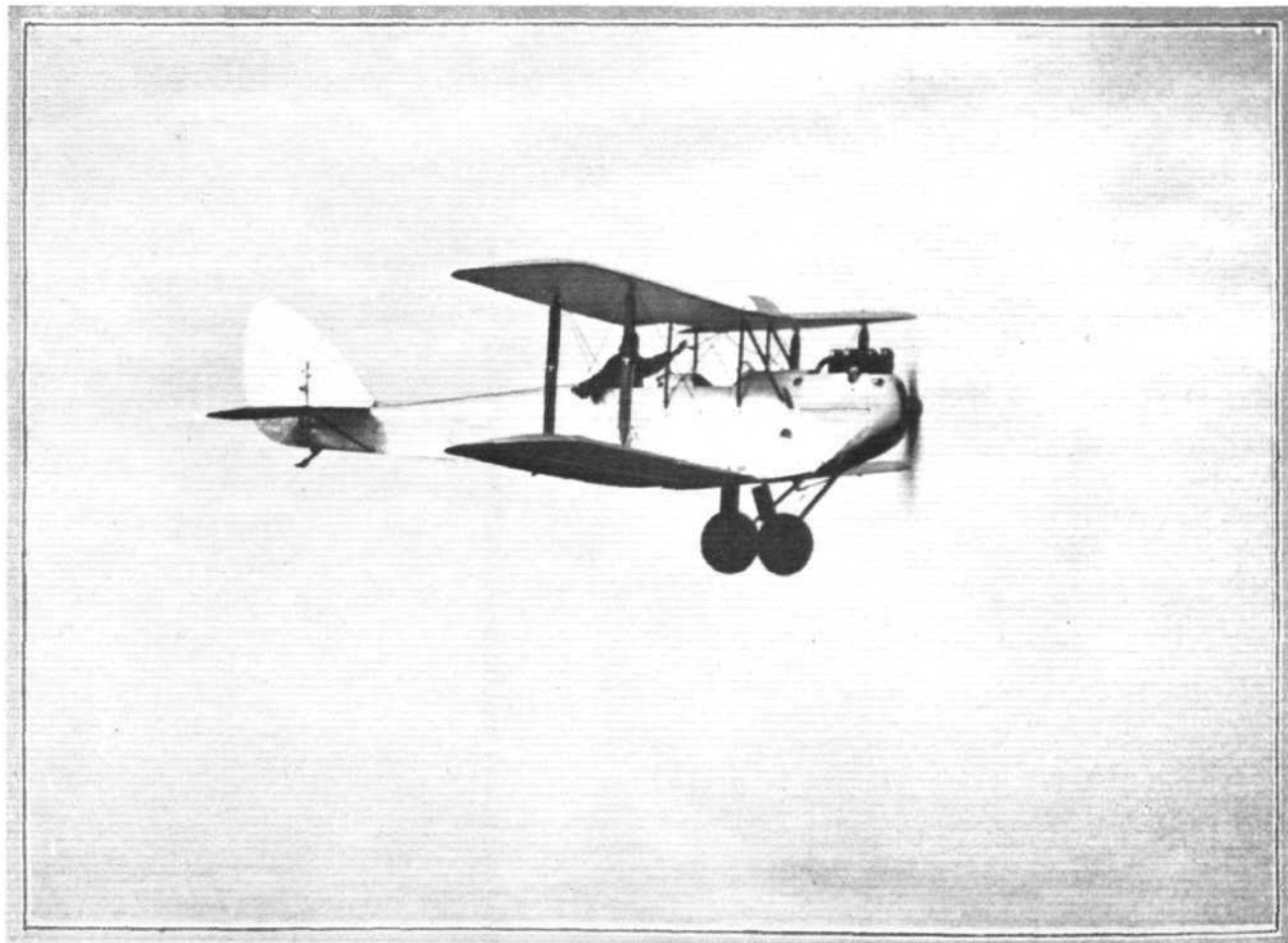
Solo:—Messrs. Abdalla, 3 hrs.; Blagden, 2 hrs. 20 mins.; Forshaw, 2 hrs. 5 mins.; Twemlow, 2 hrs.; Scholes, 1 hr. 55 mins.; Dickinson, 1 hr. 50 mins.; Lacayo, 1 hr. 45 mins.; Costa and Fallon, 1 hr. 25 mins. each; Gattrell, 1 hr. 15 mins.; Crosthwaite, 40 mins.; Nelson, 25 mins.; Goodfellow, Birley-Hardy, and Miss Brown, 20 mins. each; Goodyear, 5 mins.

Joy-rides:—With Mr. Cantrill:—Mr. Murrell, 1 hr. 50 mins (photography); Mr. Ruddy, 15 mins.; Mrs. Ruddy, Mrs. Holden, Miss Emery, Miss Roberts, Miss Turner, Miss Browning and Messrs. Goodfellow, Clark and Jones, 10 mins. each. With Mr. Lacayo:—Mr. Caldecott, 2 hrs. 5 mins.; Garlick, 10 mins. With Mr. Brown:—Mr. Murrell, 2 hrs. 15 mins. (photography); Mrs. Gattrell and Mr. Holden, 15 mins. each; Mr. Scott, 10 mins. With Mr. Goodfellow:—Mr. Leeming, 30 mins.; Messrs. F. Jones, Mills and Cantrill, 15 mins. each; P. Gattrell and Radcliffe, 10 mins. each. With Mr. Costa:—Miss Shatwell, 20 mins.; Mr. Torres, 15 mins. With Mr. Michelson:—Mrs. Fielding and Mr. Knowles, 15 mins. each. Test flights, 1 hr. 40 mins.

"Curse it! (aero) foiled again," hissed the villain, as Glad-eyed Gladys Leaped Lightly into Her Hampshire Half-cock and disappeared in a Cloud of Castrol.

By Thursday night the club had done over 50 hrs. flying. The torch, arrow, split-pin and split infinitive were sent round to members bidding them rally round and help London Tower to fall down. Alas, two well-known gents, called Boreas and Jupiter Pluvius accepted the invitation by mistake and put in a full 24 hrs. per diem. On Friday there were many winged words flying around, but no aeroplanes, while Saturday was almost as bad, though one or two hardy spirits did give an auto-gyroscopic display on the Renault-Avro. Messrs. Lacayo and Caldecott even achieved a cross-country, taking 1½ hrs. outward and 20 mins. back.

Although this week's flying effort has failed by a long way to reach London's



["FLIGHT" Photograph  
"KAMERAD!": This photograph shows Capt. Broad (not arriving over Berlin!) flying the "Moth" with both hands held high to demonstrate the stability of the machine. The machine illustrated is the actual one which Capt. Broad delivered to the German Club last week. On his way to Berlin Broad paid a visit to the Rotterdam Flying Club. (See p. 261.)



record it has not been an inglorious failure, and constitutes a Lancashire club record, both for a week and for a single day, 16 hrs. having been flown on the Sunday with only 2 Moths and the Renault-Avro available.

Messrs. Scholes and Twenlow returned safely from Bournemouth on Tuesday, both having flown excellently, as everyone who saw them will agree. Mr. Scholes did suggest that L.V. having 5 crashes to her credit, is not altogether in the racing class nowadays. The committee, however, pointed out to him that he was really sent down to Bournemouth as a typical specimen of Lancashire manhood, and that if he had been given a faster machine the spectators would not have got a proper look at him.

Our other voluntary instructor, Mr. Cantrill, covered himself with glory in the Press. He was to have flown one of the Avians, but by a stroke of very bad luck was prevented from being there. This, however, did not deter the Press (who had some difficulty with his name) and the following is typical of what one read:—"An Avian flown by Mr. Coutrill, starting in one of the Bournemouth air races, Mr. Cockerell finished second. (Inset: Mr. Cantrill, the pilot.)" He has our sympathy.

#### Midland Aero Club, Ltd.

REPORT for week ending April 23.—The total flying time was 10 hrs. 20 mins.

The following members were given dual instruction by Capt. McDermott:—E. P. Lane, G. G. Savage.

The following made solo flights:—R. L. Jackson, W. Swann, G. V. Perry, E. J. Brighton, A. J. Winstanley, J. Brinton, H. J. Willis.

Passenger flights with Capt. McDermott:—W. H. Swann, Miss F. M. Lane, Miss C. Ball, R. D. Bednell, S. H. Smith.

Passengers with Mr. Glover:—S. H. Smith, E. J. Brighton.

Passengers with Mr. Brighton:—Miss C. Ball, Mrs. Whitworth, F. J. Whitworth.

Members are cordially invited to tea at the aerodrome on Sunday, May 1, when an attractive programme has been arranged for the special benefit of ordinary members.

It is hoped that some visiting aircraft will be at the aerodrome for the occasion, and special facilities are being arranged for passenger flights from 2 p.m. onwards.

#### The Newcastle-upon-Tyne Aero Club, Ltd.

REPORT for week ending April 24.—Flying was possible on only four days of the week.

Total time: 29 hrs. 25 mins., QV-19.4, LX-9.45, made up as follows: Dual, 15.05, Solo (Training), 2.40, "A" Pilots, 10.50, Joyrides, 35 mins. Tests, 15 mins.

The following members flew under instruction with Mr. Parkinson:—Mrs. Heslop, Miss Leathart (Secondary), Capt. Milburn, Mr. A. E. George, Mr. W. M. MacKay, Mr. M. G. Thirlwell, Mr. L. M. Middleton, Mr. J. M. Kennedy, Mr. G. H. Twine, Mr. A. I. Rasmussen, Mr. F. L. Turnbull, Mr. H.

Ellis (Secondary), Mr. Mathews, Mr. J. Stawart. Solo: Mr. J. Stawart, Mr. F. L. Turnbull.

"A" Pilots.—Mr. H. H. Leech with Mr. Thirlwell, Miss Leathart, Mr. C. Thompson with Mrs. Heslop, Mr. Palmer, Mr. Luckman and Mr. W. Todd, Mr. R. N. Thompson with Mrs. W. B. Ellis, Dr. L. H. B. Dixon with Mr. Law, Mr. H. Ellis with Mr. Ogden, Mr. and Mrs. White, Mr. Mathews, Mr. A. Bell with Mr. J. Bell.

Joyrides with Mr. Parkinson:—Miss Kennedy, Miss Berry, Mr. Bulman and Mr. Ogden.

The flying meeting will be held on Saturday, June 11, not on September 3, as previously announced. The club had hoped to hold this meeting on Whit Monday, but recently learnt that The Royal Aero Club had arranged a meeting for this date.

#### The Yorkshire Aeroplane Club

REPORT for the week ending April 23.—The total time flown for the week amounted to 19½ hrs., consisting of 10 hrs. 20 mins. solo; 6 hrs. 20 mins. instruction; and 2 hrs. 35 mins., joyriding.

The soloists were:—Messrs. Carter, Clapham, L. S. Dawson, Mann, Wayman and Wilson.

The following received instruction:—Messrs. Brown, R. K. Lax, Ling, Little, Swift, Weaver, Wilson and Wormald.

Joyriders:—Messrs. Andrews, Lapish, Smith, J. and P. Weaver, Wilcox, The Misses Langrick, Mrs. Wilson and Miss Wormald.

Our programme this week was as follows:—Easter Sunday: Mr. Wilson was launched on his first "solo," which occupied 25 minutes, and put up an excellent show.

Tuesday: Messrs. Dawson and Wayman each flew with a passenger on cross-country flights, which embraced the Harrogate, Scarborough and Filey districts. Mr. Dawson appeared over the Wetherby Racecourse at the conclusion of the meeting.

Wednesday: No flying was possible until the evening on account of the gale.

Thursday: To-day was occupied with the R.A.F. visit to Leeds. Mr. Beck flew over from Sherburn in "LS," and landed in the Military Field, Roundhay, shortly after 10 o'clock, but the four Hawker-Horsleys from Spittlegate Aerodrome did not appear over Leeds until midday. After circling the City for 15 minutes, they landed and were taxied up alongside the "Moth." The public was then admitted to inspect the machines. In the afternoon, Mr. Parkinson of the Newcastle Club flew over from Cramlington and gave a fine exhibition over the crowd.

Friday: Mr. Beck flew "NN" back from Leeds to Sherburn.

Saturday: Mr. Beck with Mr. Weaver as passenger flew over to Beverley, where they landed on the racecourse. After an excellent lunch at the "Beverley Arms" they returned to Sherburn.

During the week two more members have joined our ranks. They are Mr. E. Vincent P. Miller of Grappenhall, near Warrington, and Mr. Peter Weaver, who hails from Melton Mowbray.

### SUBSIDISED LIGHT AEROPLANE CLUBS, 1926\*

Club.	Average Membership.				Flights and Hours.									
	Flying Members.		Asso- ciates.	Total.	Members not qualified as pilots.				Members qualified as pilots.		Instructors (Flying as pilots but not as instructors).		Total.	
	Not quali- fied.	Qualified (A or B licences)			Solo.		Dual.							
					Flights.	Hours.	Flights.	Hours.	Flights.	Hours.	Flights.	Hours.	Flights.	Hours.
London .. .. .	151	22	91	264	260	112	1,859	796	760	307	709	199	3,588	1,414
Hampshire .. .. .	59	3	73	135	105	22	502	169	31	12	149	38	787	241
Lancashire .. .. .	85	9	35	129	226	99	1,380	578	360	162	451	88	2,417	927
Midland .. .. .	45	3	139	187	124	59	419	239	171	77	246	83	960	458
Newcastle-upon-Tyne ..	69	10	45	124	115	59	1,196	607	520	280	249	78	2,080	1,024
Yorkshire .. .. .	137	2	22	161	175	56	421	180	110	28	114	30	820	294
Total, 1926 .. .. .	546	49	405	1,000	1,005	407	5,777	2,569	1,952	866	1,918	516	10,652	4,358
†Total, 1925 .. .. .	477	12	291	780	137	54	1,224	552	68	27	470	94	1,899	727

NOTE.—In addition to the above, the following hours were flown on strike transport during May, 1926: London, 98 hours; Newcastle-upon-Tyne, 49 hours; Lancashire, 25 hours. The period covered is from January to December, 1926, except in the case of Hampshire, which is from August to December.

\* This table is taken from the Annual Report on the Progress of Civil Aviation. † Membership on December 31, 1925.

#### A Seaplane Flying Club

ALTHOUGH the light-plane movement is so young it is becoming our regular pleasant duty lately to record the birth of new clubs from many quarters, and now comes some very interesting information of another as far away east as Singapore. Most interesting of all is the striking originality of the club in deciding to use seaplanes, thereby rightly claiming the title of the world's first Light Seaplane Club. They tell us in a recent letter of their interest in "Light Plane Club Doings" in FLIGHT, and they want to assure the clubs at home that, although they have a good start, Singapore is by no means in the field of "also-flews." We expect full particulars of their plans by the next mail, for they have had a general meeting to decide on these, and meanwhile we note that Sir Alan Cobham's recent double visit there on his historic return flight to Australia gave impetus to them, and that they have styled themselves the "Ex-Servicemen's Flying Association" (Singapore), with Sir Theodore Fraser, K.C.B., C.S.I., C.M.G., G.O.C. Malaya, as patron.

#### A "Moth" for Germany

THE President of the German Sport Flying Club (Deutscher Sportflieger) Club, Herr Carl Bercowitz, a well-known International financier, has purchased a "Moth" for the club. This machine was flown to Germany by Captain H. S. Broad,

accompanied by Major Barber, who arrived at the Tempelhof Aerodrome, Berlin, on April 23, having left Croydon on April 22. Starting in the morning they reached Rotterdam and spent the night there, Captain Broad being the guest of the Rotterdam Flying Club. On Saturday morning the flight was resumed as far as Hanover where a delay was caused by unfavourable weather, but the journey to Berlin was commenced at 2 p.m. and accomplished in 1 hr. 15 mins., completing a 5½ hrs. total flying time. Captain Broad made a good landing at Berlin before a large gathering and was presented with a bouquet bound with the colours of London, red and white. The purchaser of the "Moth," besides other members of the German Club and representatives of the British Embassy, welcomed him and he conveyed greetings from the London Club to the German Club, whilst after Herr Bercowitz had taken the machine into the shed all had luncheon in the new restaurant in the airway station. In the evening they were entertained to dinner by the German Club. The next afternoon Captain Broad took the "Moth" to Staaken aerodrome and gave a demonstration. He was expected to return to England by the ordinary passenger aeroplane on April 25. This "Moth" is the first English aeroplane bought by Germany since the war and the hope is expressed that it will result in the establishment of closer relations between the British and German Flying Clubs.



### Duke and Duchess of York Witness Fatal Air Accident

On the arrival of the Duke and Duchess of York at Melbourne, on April 21, five D.H. 9 machines were flying in formation very low over the procession, as a part of the great welcome to Their Royal Highnesses, when two of them collided and crashed into the town, killing two pilots and two observers. One fell into a garage and destroyed seven cars, and the other fell into a side street, bringing down the electric light cables with it, and both burst into flames. The Duke and Duchess sent messages of sympathy to the relatives of the victims, who were:—Flying Officer R. I. Dines, who had served in the war with the R.F.C.; Flight-Lieut. V. H. Thorton, who had served with the Australian Flying Corps; Sergeant W. Hay; and Corporal J. Ramsden.

### The Service African Flights

THE Cairo-Cape flight ended on April 21, when the R.A.F. machines, under the command of Air-Commodore C. R. Samson, arrived at Cape Town about noon, 22 days after leaving Cairo. After five days' rest, they proceeded to Grahamstown on April 25, to co-operate with the Union Air Force, and then go to Pretoria via Durban. The long outward flight across the Continent has been very successful, the only mishap experienced being a punctured tyre at Abercorn.

### R.A.F. Home Defence "Show the Flag" Tour

THE tour of the four Horsley day bombers of No. 11 Squadron, Home Defence Force, known as the "Showing the Flag by Air" tour, started from Netheravon on April 20 and arrived that afternoon at Spittlegate Aerodrome, Grantham, which they left the next morning and reached Leeds about noon, landing on the Military Field, Roundhay Park. Here they received a civic welcome and were entertained at luncheon in the Town Hall. This represented the first stage of the flight. They next proceeded to Liverpool and left on Saturday, April 23, for Bristol, which they reached in 1 hr. 10 mins., the distance being 138 miles. One by one they made perfect landings near Sea Walls and again received a civic welcome. Nottingham was the next town in the tour and here, at a civic luncheon, the leader, Wing-Commander J. H. A. Landon, was presented with a portrait of Capt. Albert Ball, V.C., for No. 11 Squadron, and in acknowledging the gift he said that the R.A.F. was young to have traditions, but if there were any they started with Albert Ball and his contemporaries.

### The Atlantic Attempts

For the third time ill-luck has marred ambitious projects for the North-Atlantic crossing between New York and Paris, for the "Pathfinder" machine, in which Commander Noel Davis, U.S.N., intended shortly to make an attempt, crashed into 4 ft. of water when trying a right-hand turn to avoid some trees at Black River, Virginia, and the Commander and his companion, Lieut. Stanton H. Wooster, were drowned. They only fell 20 ft. They had left the Langley Field for a final test flight, carrying a load of 13,000 lbs., which was the first time that this full load had been lifted. It will be remembered that Commander Byrd recently crashed when making a test flight, whilst Captain Fonck came to grief last September when he was actually setting off to cross the Atlantic. Another intending competitor, Captain Nungesser, has delayed his start in order to make certain modifications to his Levasseur machine. The only remaining entrant in America now is the Wright-Bellanca monoplane, which recently set up a duration record. Captain Saint-Roman, who damaged his machine when trying to lift off in heavy water outside Casablanca, has decided to continue his flight across the South Atlantic with his machine converted from a seaplane to a landplane. He hoped to leave for Dakar on April 21.

### A Real Airport

At the Tempelhof Aerodrome, Berlin, considerable expansions are taking place to meet with the air traffic expected this summer, and on April 9 a large central building was opened which houses administrative offices, the meteorological station, two wireless rooms (from one of which communication is made with other stations and from the other with machines in flight) and also a telegraph room containing

direct lines to all the chief aerodromes. All this is in the eastern wing. The centre portion forms the actual airway station, being completely equipped with waiting rooms, ticket offices, cloak rooms, Customs Department, and a post office having a pneumatic tube connection with the city. The west wing contains a large dining room, tea rooms and a roof garden restaurant and terrace. This wing holds accommodation for 4,000 people, and is kept separate from the passenger department. It is hoped that it will become a popular resort in summer, not only on special occasions. The "platform" is railed off, and the machines now taxi close to it on a wide stretch of concrete; an improvement on last year's arrangements, which often involved the passengers in a long walk across the aerodrome.

### A Yugoslav Long-Distance Flight

Two Yugoslav officers, Lieut. Bardac and Capt. Sondermayer, left Villacoublay in a Potez 25 biplane, fitted with a 450-h.p. Lorraine Dietrich engine, on April 20, at 5.47 a.m., with the intention of flying to Calcutta via Belgrade, Constantinople, Karachi and Bombay, and then back to Belgrade. They reached Belgrade on the first stage and left for Aleppo on the second stage on April 21. They arrived there on April 22 and left for Baghdad and Basra. On the same type of machine two French airmen, Capt. D'vè and Adjutant Rossi, started for Colomb-Bechar, a distance of 1,375 miles, on a non-stop flight.

### The Light Plane in South Africa

MAJOR MILLER, a member of the Legislative Assembly, reached Durban on April 25, on his way from Capetown to Pretoria, a distance of 1,100 miles via Durban, flying a "Moth," which is the only light aeroplane in the country. He covered 300 miles that day and aroused the keenest interest, particularly among the natives. After visiting Zululand, he expected to join the British and South African machines flying to Capetown.

### The R.A.F. Display

At the Hendon display in June this year, five R.A.F. pilots will fly "Moths" and give an exhibition of wing-to-wing flying with sideslips, rolls and many other manoeuvres. This will be the debut of the light aeroplane in a prominent way at the pageant.

### Capt. Wilkins in Australia—By Wireless

A PRIVATE wireless experimental station in Australia picked up a message from Captain Wilkins' expedition in Alaska on a 42-metre wavelength on April 23, but the full nature of it was not disclosed, although it is understood that Captain Wilkins' aged mother, who lives in South Australia, was informed of her son's safety.

### Another D.H. "Hercules" Christened

KING FEISAL named one of the de Havilland "Hercules" machines the "City of Baghdad" recently. The machine operates on the Cairo-Basra route. After the ceremony King Feisal and other notables of Iraq made flights.

### The Master of Sempill's 500 Miles in a "Moth"

AFTER competing in the Easter meeting races, Colonel The Master of Sempill flew from Bournemouth on a "Moth" to the Lizard, Cornwall, on April 19, in 2 hrs. 15 mins., and left at 4.10 p.m. the same day on return to Bournemouth. After tea he left again and flew to London, arriving at Stag Lane at 7.30 p.m. He had covered a distance of approximately 500 miles.

### The Duchess of Bedford's Air Tour

THE Duchess of Bedford left Woburn Park, Bedfordshire, on April 21, for a fortnight's tour abroad in a "Moth" machine, piloted by Captain Barnard. The first stage was Paris, and from there the route will be through Spain and Morocco.

### Cairo-Karachi Air Route

PENDING the settlement of the negotiations with the Persian Government over their ban on our Cairo-Karachi air route in that country, the latter has agreed to permit eight flights over Persian territory.

### "Light" Refreshments for Air Travellers

IMPERIAL Airways have fitted up buffets on their three Argosy machines, and light refreshments will be served by waiters during flight.



# The AIRCRAFT ENGINEER

FLIGHT  
ENGINEERING  
SECTION

Edited by C. M. POULSEN

April 28, 1927

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## EDITORIAL VIEWS

In the present issue of THE AIRCRAFT ENGINEER a departure has been made from our usual practice by including an aeroplane description. The circumstances are somewhat unusual, as explained in the introductory remarks, and the publication of this article must not be thought to establish a precedent, since we have no intention to devote space in this section of FLIGHT to purely descriptive articles.

The P.M.3 machine with which the article deals is of considerable interest on account of its somewhat unusual arrangement and its high aerodynamic efficiency (a full-scale maximum L/D of 18 is claimed), and as the efficiency of aircraft must necessarily be improved if commercial utility is to be attained, it is thought that a critical examination of the design may be of interest.

The whole problem of whether or not an actual machine of the size contemplated can be built for a reasonable structure weight is a controversial one, and although there may be those who hold that this is possible, we believe that the majority of British designers will agree with the views expressed by the Editor that the extra economy promised by the excellent model results may soon be swallowed up if the structure should work out heavier than estimated.

It may, perhaps, be recollected that in one of the instalments of his series of articles on "Aircraft Performance," Mr. J. D. North referred to the Lympe light planes (with 1,100 cc. engines), and pointed out that the opinion expressed by some, that these little machines provided an example of how designers of commercial machines could make their machines more efficient, was doomed to failure. At the time

Mr. North pointed out that the  $\frac{\text{Span}^2}{W}$  ratio of these little machines was 1 to 1.5, as compared with 0.3 to 0.5 for the average aeroplane. The induced drag was therefore very low, and large machines, to obtain the same induced drag, would have to have wing spans of 110 to 150 ft.

Now it would seem that the Martin P.M.3 is up against precisely this fundamental fact, that to get the same "span squared over weight" ratio as the model, some rather extraordinary construction would have to be employed. On the basis of the figures given by Mr. Martin, the value of this ratio for the P.M.3 would be 1.16, but any serious change in structure weight would rapidly decrease this figure.

## AN INTERESTING AIRCRAFT DESIGN.

Martin P.M.3 discussed by THE EDITOR.

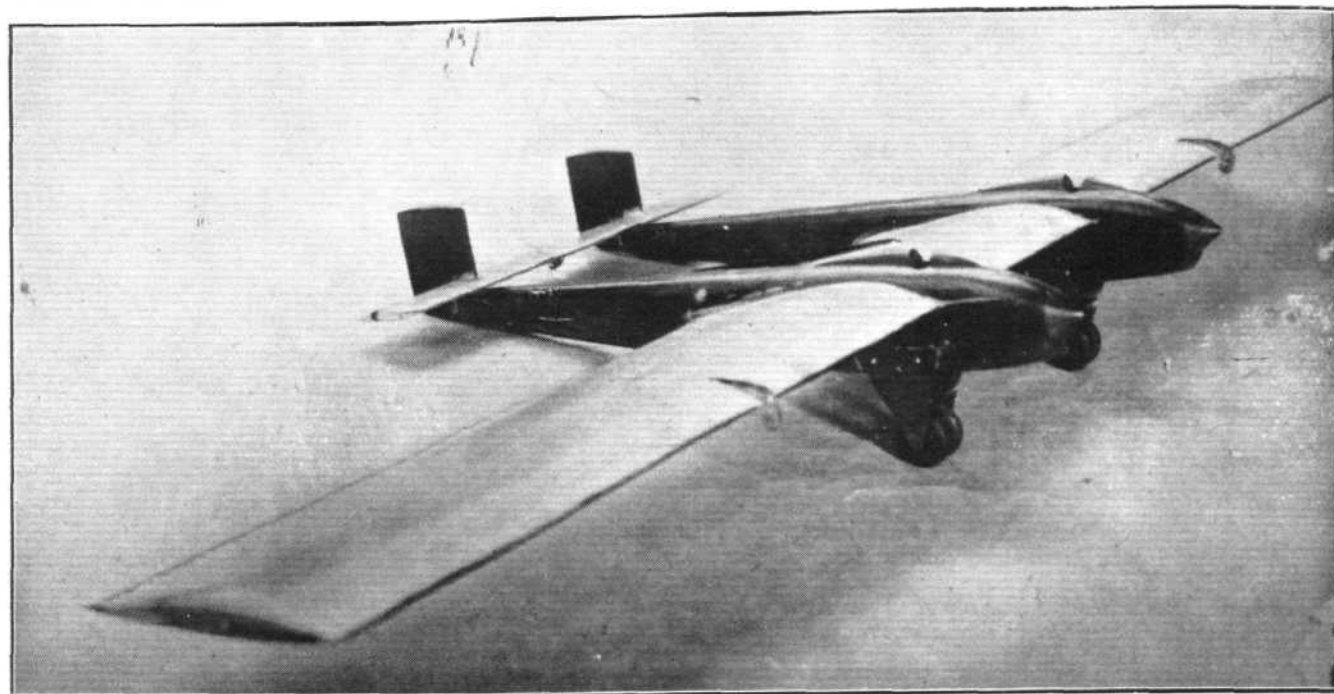
This article is a somewhat unusual one for THE AIRCRAFT ENGINEER, being an examination of a design by the American aircraft designer, James Martin. For the benefit of readers not intimately familiar with the early history of flying in this country, it may be pointed out that James V. Martin was, for a considerable period before the war, connected with the Grahame-White Company at Hendon, where he designed a little pusher biplane of the "box-kite" type that was so popular at Hendon in those days. Mr. Martin went back to the United States, where he has been working since. Some years ago he paid a visit to this country, when he visited FLIGHT offices, bringing with him a sketch design for a tiny aeroplane in which the undercarriage was designed to fold up into the fuselage. A special feature of the design was that the pilot was intended to lie down prone in the fuselage, looking out through windows, this peculiar arrangement being chosen in order to reduce the cross-sectional area of the fuselage to a minimum. This sketch design was published in FLIGHT at the time.

James V. Martin has for years been a seeker after aerodynamic efficiency, and was among the first to patent retractable undercarriages. It is not, therefore, to be wondered at that this feature is incorporated in his latest design, published herewith. In fact, although the designer does not specifically state this to be the case, one may assume that the twin-fuselage arrangement was chosen, among other reasons, for the greater facility with which retractable undercarriages can be incorporated in this manner.

Accompanying the general arrangement drawings, wind tunnel curves and performance curves sent to us by Mr. James V. Martin was a non-technical article entitled "How to Make the Commercial Aeroplane Pay." This article was, however, obviously written with the object of explaining, in non-technical language, to the business man not familiar with the technical aspects of air transport, methods whereby the aerodynamic characteristics of aeroplanes can be improved, and the effect, in dollars and cents, which such improvement has upon the dividend-earning capacity of a machine. For publication in THE AIRCRAFT ENGINEER it was not thought that this article was quite suitable, and the Editor decided to describe the machine from a rather more technical point of view, quoting from Mr. Martin's article such passages as appeared relevant to the more technical treatment.

In order to appreciate the *raison d'être* of the Martin P.M.3, one should know that Mr. Martin has for many years been a believer in the bi-convex wing section, holding the view that

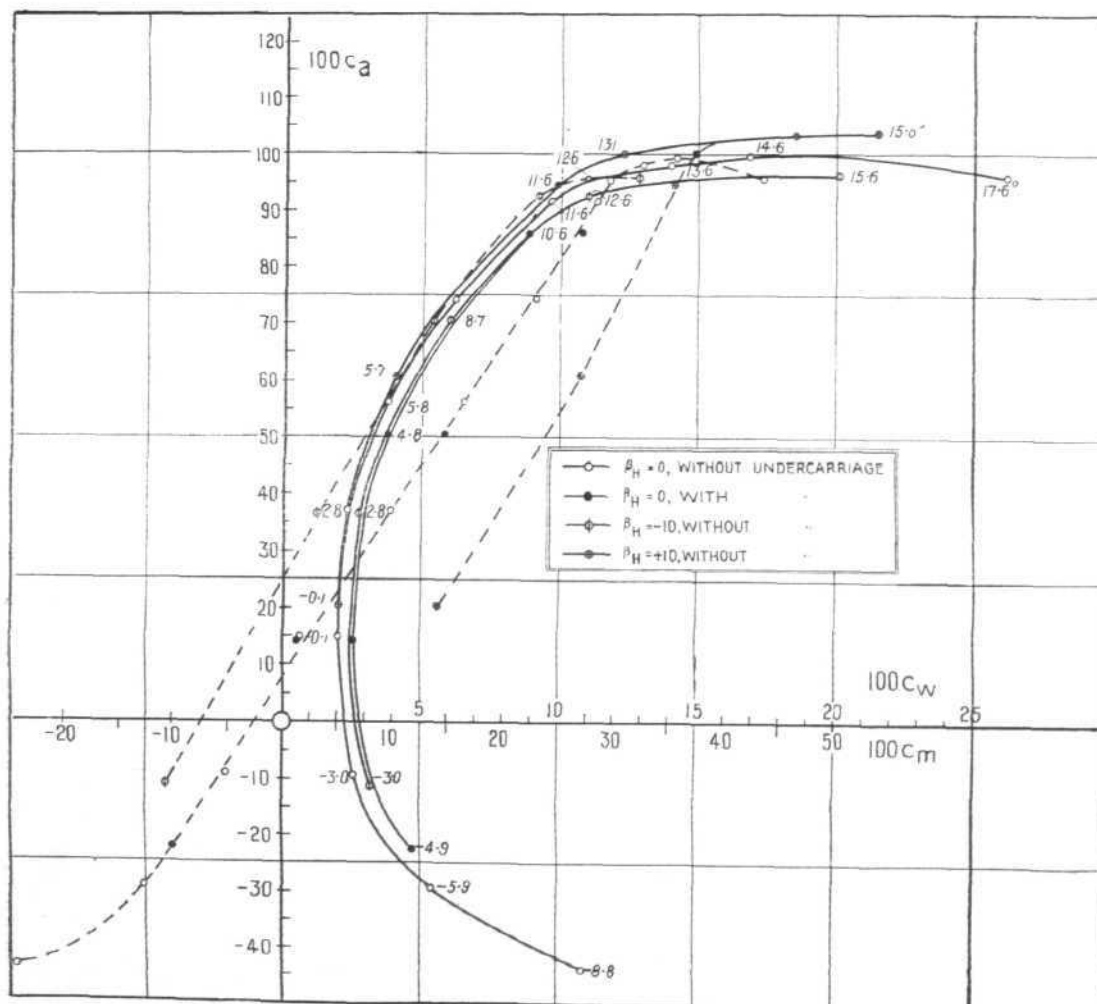
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THE MARTIN P.M.3: Photograph of the wind tunnel model.

this type of section holds out promise of good  $L/D$  combined with a reasonably high maximum lift coefficient. Mr. Martin has designed several machines with wings of this section, and the one under discussion here shows a bi-convex aerofoil section with very sharp "nose." The monoplane type of wing has been chosen, and as already mentioned, two fuselages, each carrying an engine and accommodating passengers and/or goods, are another feature of the design.

The first step in the evolution of the Martin P.M.3 was the testing of a model in the Göttingen wind tunnel. A photograph of this model is given herewith. We have by us a photostat copy of the original Göttingen curves, on which it is stated that the wing area of the model was 0.2385 sq. m. (2.57 sq. ft.), and the lateral axis was through the foremost point of the wing plane. As indicated on the chart giving the wind tunnel results, published herewith, the model was tested



THE MARTIN P.M.3: Curves of lift, drag, etc., obtained in the Göttingen wind tunnel. The maximum  $L/D$  is 18.

with and without undercarriages, and with tail-settings of 0, -10, and +10 degrees. The maximum  $L/D$  obtained was 17. With corrections for scale this is, Mr. Martin states, increased to 18, a very good result indeed. Referring to the wind tunnel chart, it will, of course, be realised that this is plotted in the usual German style, with lift coefficient  $C_L$  plotted against drag coefficient  $C_D$ , and moment coefficient  $C_m$ . The German units being different from ours, and incidentally  $C_L = 100 C_L$ , the coefficients shown on the chart may be converted to British "absolute" coefficients by dividing them by 200, so that the maximum lift coefficient of the Martin P.M.3 model is approximately 0.5, not a very high value, while the minimum drag coefficient of the model of the whole machine is 0.01, in "absolute" units.

Compared with the general run of commercial aircraft, a maximum  $L/D$  of 18 is, of course, extraordinarily high, and if the large machine contemplated can be made to

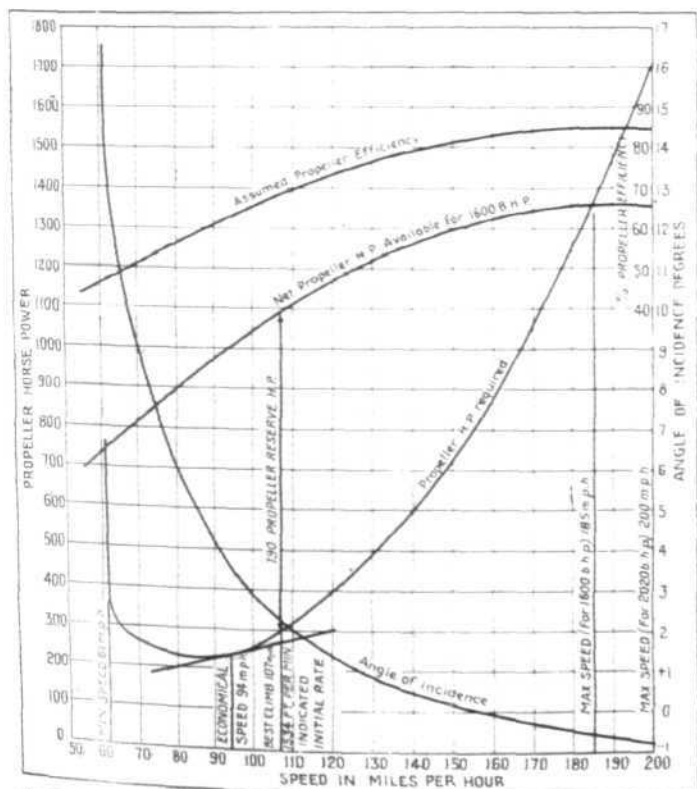
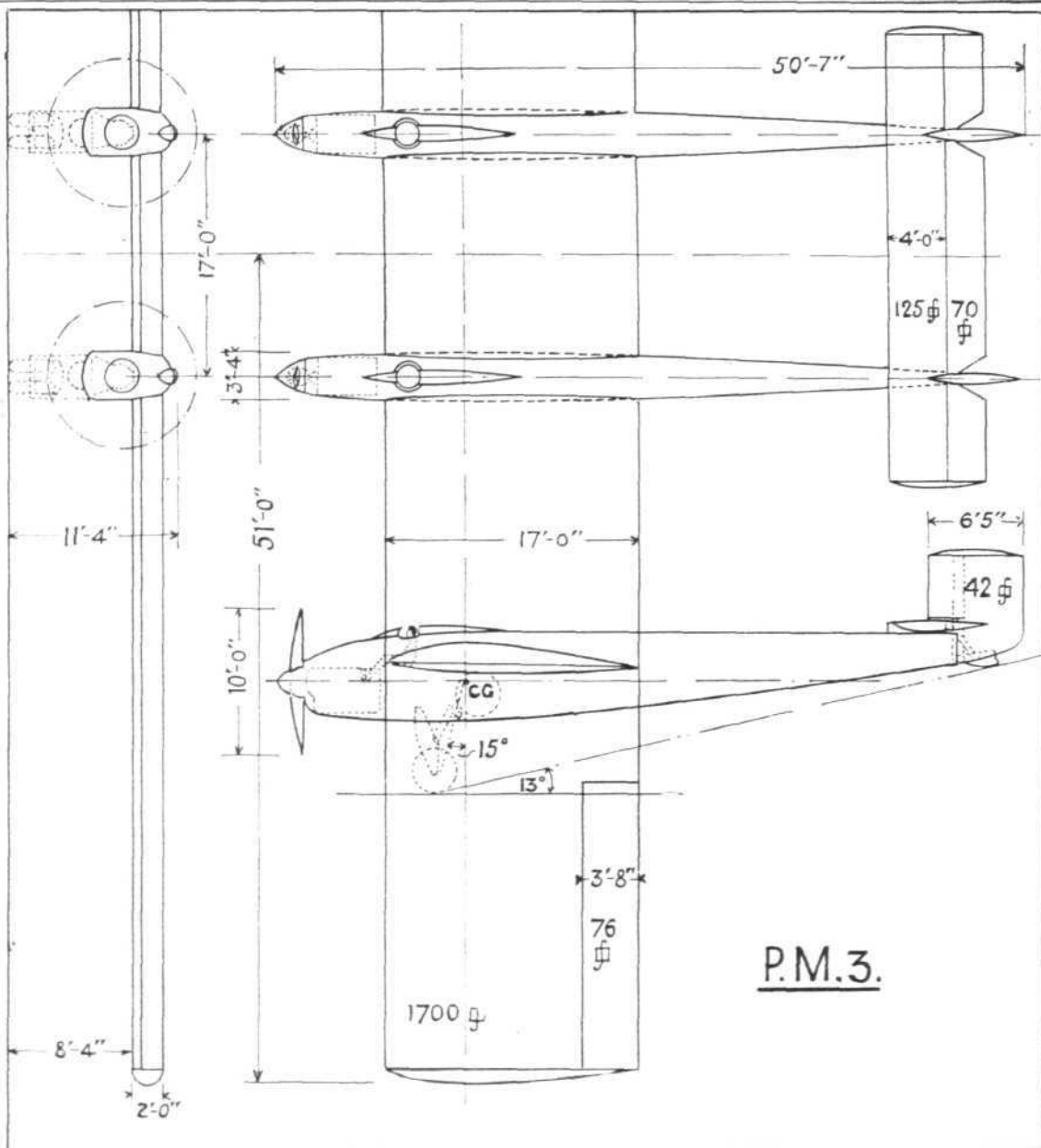


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have the same high efficiency, the aspect of commercial aviation should be considerably changed, and the day brought much nearer when aviation can pay for itself without Government subsidy. The subject is one of such importance that the present design appears to merit close inspection.

In his non-technical article Mr. Martin says: "It will amaze the thoughtful business man to find that more than half of the resistance of the present-day, or 'bird-cage,' type of aeroplane is of the useless variety." He then goes on to explain what this high drag or resistance means in loss of speed and carrying power, and in increase in fuel consumption. Abbreviating the title of his "birdcage" type of machine to BC (one does not know whether a subtle piece of humour is meant to be conveyed by this choice of reference letters!), Mr. Martin compares the economy of the "BC" machine with the P.M.3. Briefly, his argument is as follows:—

If the horse-power of the two machines is compared, i.e., power required to drive the two machines



**THE MARTIN P.M.3:** Performance curves based upon the Gottingen model results. The main data used are: Wing area, 1,785 sq. ft.; engine power, 1,600 h.p. Total loaded weight, 17,000 lbs.

## THE MARTIN P.M.3: General arrangement drawings.

at the same speed, say of 110 m.p.h., the thrust of the "BC" machine, which Mr. Martin claims to have, at that speed, an L/D of 4 only, will require to be one-fourth of the total weight. At the same speed the L/D of the P.M.3 is 20, and the thrust required is only one-twentieth of the total weight. If the paying loads are compared, it is found, Mr. Martin says, that the "BC" machine weighs, roughly, as much as it carries, i.e., if the machine weighs, without fuel, 10,000 lbs., it can carry 10,000 lbs., and its total loaded weight will be 20,000 lbs. With a lift-drag ratio of 4, this machine would require horse-power for 5,000 lbs. thrust at 110 m.p.h., and a quantity of fuel in proportion to this power. The P.M. type, on the other hand, would only require power for 1,000-lbs. thrust at the same speed. If the P.M. machine required 200 lbs. of fuel per hour to drive it at this speed, the "BC" plane would require 1,000 lbs. of fuel per hour, or, roughly, 7,000 lbs. on the New York-Chicago trip, leaving 3,000 lbs. for paying load. Assuming that the light weight of the P.M. machine was the same as that of the "BC," the more efficient machine would have a pay load on this trip, at the same speed, of 8,600 lbs. Mr. Martin points out that this supposition about weight would be wrong if the P.M.3 motors were proportioned for only 110 m.p.h., because in that case the motors would weigh one-fourth of the weight of those required to drive the "BC" type. He claims that this difference in motor weight, together with the simpler construction of the P.M. machine, would equal the fuel weight, so that the New York-Chicago passenger and fuel load for the P.M.3 at 110 m.p.h. would be 10,000 lbs. The P.M. machine has four times the required power, and, in fact, is claimed

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to be capable of 140 m.p.h. on one of its two 800 h.p. motors, the excess being employed for accomplishing that which would be impossible to the "BC" machine, *i.e.*, a speed of 185 m.p.h., or New York-Chicago in 3½ hours.

Allowing for a slight slip on the part of Mr. Martin in using a maximum L/D of 20 instead of that of 18 indicated by model tests, the reasoning is sound enough, the only doubtful point being whether the light weight of the P.M. machine can be kept down to that of the "BC" type. An examination of the drawings indicates that the overall span of the P.M.3 is 102 ft., the chord 17 ft., and the wing area 1,700 sq. ft. or so.

Now, a cantilever monoplane wing of this size is likely to be a good deal heavier than a biplane wing structure of the same area. (We assume, of course, from his reference to the "birdage," that Mr. Martin is referring to a biplane with the usual strut and wire bracing.) In the data printed on the sheet of G.A. Drawings sent us, no detailed wing weight is stated, but the following weight estimates are given: two propellers, 170 lbs.; two motors, 2,280 lbs.; two pilots and instruments, 400 lbs.; two undercarriages, 600 lbs.; tanks, ailerons, radiators, wings (@ — lbs./sq. ft.) (the actual figure is illegible—Ed.), 4,200 lbs.; two fuselages, 1,000 lbs.; horizontal surfaces, 220 lbs.; two rudders and skid, 130 lbs. Total empty weight, 9,000 lbs. Whether or not these figures are practically attainable we cannot say. To us it seems somewhat doubtful. Unless they are, most of Mr. Martin's argument falls to the ground, since a serious increase in wing weight would have a pronounced effect on the useful load. In his article Mr. Martin arrives at 5,000 lbs. as the paying load of his machine on the New York-Chicago flight (non-stop). As he has evidently used an L/D of 20 instead of 18, and if we assume the empty weight of his

machine to work out somewhat greater than estimated, the difference between the 3,000 lbs. pay load of the "BC" machine and that obtainable with the P.M. type might not be quite so great as the figures indicate.

Nevertheless, the Martin P.M.3 is a very interesting machine, and the performance curves are worth perusing. To have attained an L/D of 18 is something of an achievement, especially since the high efficiency is accompanied by a distribution of weight which would, presumably, help somewhat towards realising a better empty weight than would be possible in a single-engined, single-fuselage machine with the weight concentrated in the centre. (The distance separating the two fuselages, by the way, is 17 ft. over centre lines.)

It would be interesting to have the views of British designers on the P.M.3, and we are sure Mr. Martin would welcome a discussion of his design.

## IN THE DRAWING OFFICE.

### RAPID ESTIMATION OF STRESSES IN UNIFORM STRUTS.

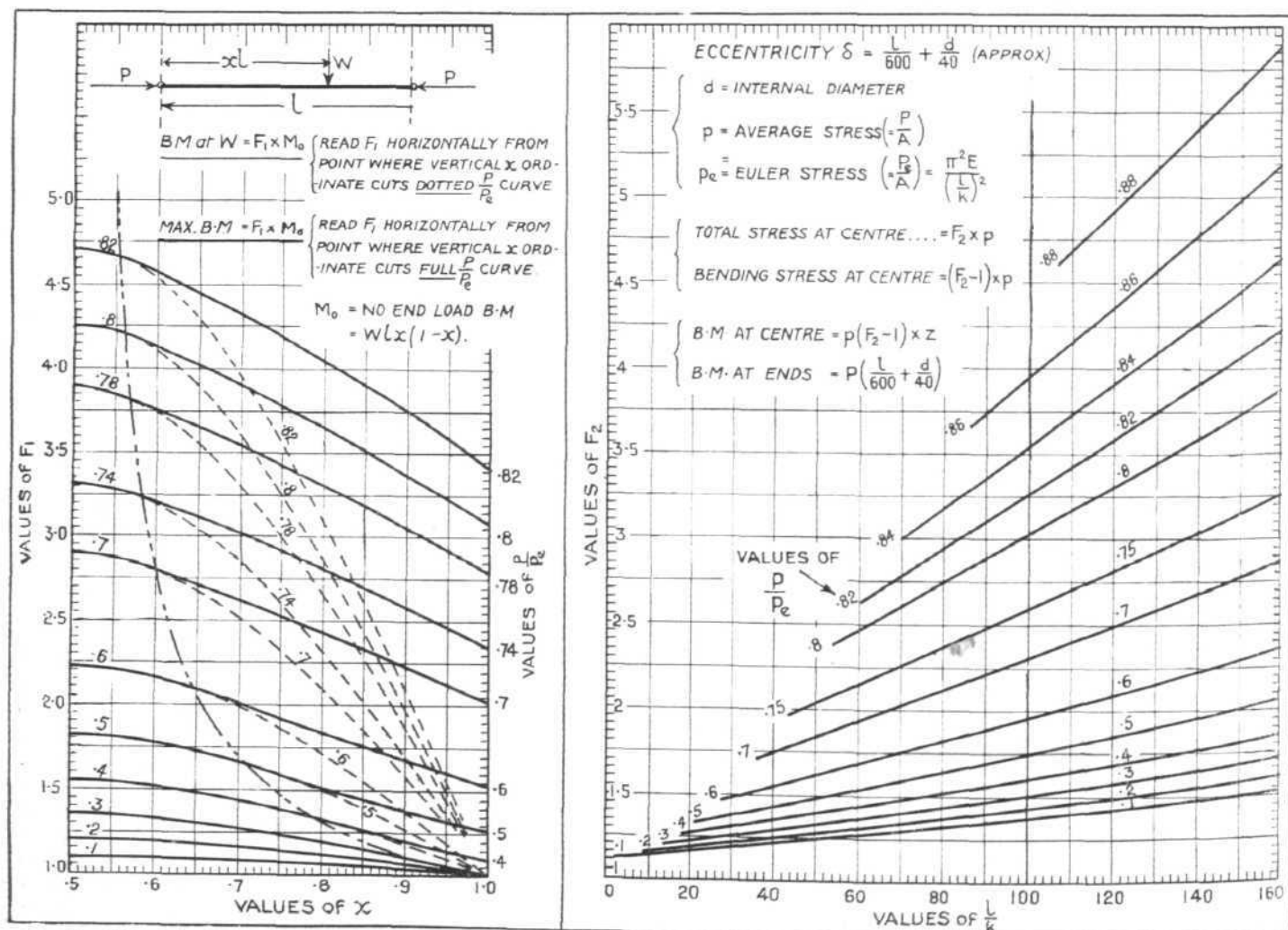
By H. A. FRANCIS, B.A.

#### Section 1.—Concentrated Lateral Loads on a Strut.

(a) This case is of frequent occurrence on an aeroplane—the commonest examples perhaps being tanks on the top wing spars and military load attached to longerons.

The bending moment, when end load is zero, can easily be found, but the effect of end load lengthens the calculation, particularly as the maximum B.M. does not necessarily occur at the lateral load.

(b) From the curves of Fig. 1 one can obtain an end load B.M. factor corresponding to the Perry factor for distributed



On the left, Fig. 1, curves for pin-jointed struts with lateral load (any material or cross section). On right, total stress on tubular struts with eccentric application of end load. Note.—In Fig. 1, for finding position of maximum bending moment, if the  $x$  ordinate cuts the full  $P/P_c$  curve to the left of the chain curve, then maximum B.M. occurs at  $W$ . If the  $x$  ordinate cuts the full  $P/P_c$  curve to the right of the chain curve then maximum B.M. occurs where  $P/P_c$  curve cuts chain curve.



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load, but entailing no approximations beyond those of the usual beam and strut theory.

The only calculations required are:—

- (1) The no end load B.M. which =  $W.l.x$  ( $1-x$ ) if  $W$  divides the strut into lengths  $x.l$  and  $(1-x).l$ .
- (2) The Euler failing load for the strut, =  $P_e$ .

This leaves the material and cross section unrestricted.

The factor  $F_1$  is read horizontally from the point of intersection of the  $x$  ordinate with the appropriate  $\frac{P}{P_e}$  curve, at O, say.

For maximum B.M. use the full curves, and for the B.M. at  $W$  use the dotted curves.

The Position of the Maximum B.M. is at  $x'.l$  from the end;

where  $x'$  is given by the intersection of the full  $\frac{P}{P_e}$  curve with the locus of  $x'$  (the chain curve).

If, however, the point O is situated to the left of this chain curve, then  $x' = x$ , i.e., the maximum B.M. occurs at the lateral load.

$$(c) \text{ Example. } \begin{cases} 1 = 0.0254 \\ A = 0.1372 \\ Z = 0.0407 \\ k = 0.43 \end{cases}$$

$$P = 5,840 \text{ lbs. } P_e = 8,340 \text{ lbs.}$$

$$[E = 30 \times 10^6 \text{ lbs. per sq. in.}]$$

$$x.l = 24 \text{ in. } l = 30 \text{ in.}$$

$$M_o = 4.8 W \quad F_1 = 2.09 \text{ and } 2.42$$

$$\frac{P}{P_e} 0.70 \quad x' = 0.6$$

$$\text{B.M. at } W = 2.09 \cdot 4.8 W = 10.02 W.$$

$$\text{Max. B.M.} = 2.42 \cdot 4.8 W = 11.6 W \text{ and occurs at } 0.6 \times 30 \text{ ins.} = 18 \text{ ins. from end.}$$

$$\text{Max. Stress} = (19 + 0.127 W) \text{ tons sq. in.}$$

(d) Case of more than one lateral load.

The B.M. diagram for each load, taken separately, may be sketched through the one or two points got by the above method.

All the B.M. diagrams can then be superimposed, giving a diagram which would be accurate enough as regards its maximum value.

In the case of continuous wing spars carrying tanks, we must also superimpose the fixing moments at the supports, as found by the theorem of three moments, before adding the whole algebraically to the final air load B.M. diagrams.

(e) Couple applied at end of a strut.

In this case we use the value of  $F_1$  at  $x = 1$  to give the maximum B.M. The position is given by the intersection of the chain curve with the  $\frac{P}{P_e}$  curve as before. (Here  $F_1$

$$= \text{Cosec } 2\alpha \text{ where } \alpha = 90 \sqrt{\frac{P}{P_e}} \text{ degrees.}$$

As in the case of several concentrated loads, we can superimpose the effect of unequal couples at each end of the strut.

### Section 2.—Stress due to Eccentricity.

The bending moments calculated in Section 1 do not include the effect of eccentric application of end load. This is an important effect, and as likely as not will increase the B.M. due to lateral loading.

For commercial tubes, the end eccentricity is assumed to be  $\frac{\text{Length}}{600} + \frac{\text{Internal diam.}}{40}$  and Southwell curves of limiting average stress against  $\frac{l}{k}$  for various yields are commonly used.

When, however, the applied end load is less than its limiting value, the stress due to bending is not conveniently deduced from these curves.

The equation for a Southwell curve is  $p = \text{limiting average}$

$$\text{stress} = \frac{\text{Yield stress}}{1 + \frac{d.\delta}{2k^2} \cdot \text{Sec } \frac{l}{k} \sqrt{\frac{P}{4E}}}$$

In Fig. 2 this is plotted in a different form, namely:—

$$F_2 = \frac{\text{Total stress}}{\text{Average stress}} = 1 + \frac{d.\delta}{2k^2} \text{Sec } \frac{\pi}{2} \sqrt{\frac{P}{P_e}}$$

and  $P$  may be less than the limiting load.

The same curves are used for any yield stress, and the value of  $E$  is left to the choice of the user.

$$\text{It is assumed that } \frac{d.\delta}{2k^2} = \frac{\sqrt{2}}{600} \cdot \frac{l}{k} + \frac{1}{10}$$

The maximum stress under any end load  $P$  is  $F_2 \cdot \frac{P}{A}$ , or  $F_2 \cdot p$ .

The maximum stress due to bending is then  $(F_2 - 1) p$ , and logically most of this should be added to the stresses obtained with the lateral loads in Section 1.

If desired, the B.M. diagrams may be sketched and added to the other diagrams.

B.M. at centre is  $(F_2 - 1) \cdot p \cdot z [= P.\delta \cdot \text{Sec. } \alpha]$

B.M. at ends is  $P.\delta$ .

Referring back to the example:—

$$\frac{l}{k} = 70; \quad \frac{P}{P_e} = 0.7; \quad F_2 = 2.025; \quad \frac{P}{A} = 19 \text{ tons sq. in.}$$

$\therefore$  Extra bending stress due to eccentricity of end load =  $1.025 \times 19 \text{ tons per sq. in.}$

$\therefore$  Total stress is slightly less than  $(38.5 + 0.127 W) \text{ tons per sq. in.}$

unless there is evidence that the eccentricity causes deflection in the opposite direction to the lateral load.

## TECHNICAL LITERATURE.

### SUMMARIES OF AERONAUTICAL RESEARCH COMMITTEE REPORTS.

#### TESTS ON HANDLEY PAGE AEROFOIL A.I. AND R.A.F. 31.

Communicated by Messrs. HANDLEY PAGE, LTD.

R. & M. No. 1055 (Ae. 238). January, 1926 (32 pages and 5 diagrams). Price 1s. 3d. net.

This report is presented in three sections, A, B and C:—

Section A.—Descriptive account of H.P. Aerofoil A.I. with front slot and slotted flap. Curves give the value of the pressure plotting over the auxiliary aerofoil.

Section B.—Descriptive account of H.P. Aerofoil A.I. with front slot and slotted flap. Deductions from monoplane tests of rolling and yawing moments by differences in  $K_L$  and  $K_D$ . Values of the ratio of yawing to rolling moments are given for angles of incidence from  $4^\circ$  to  $24^\circ$ .

Section C.—Ordinates and data for R.A.F. 31, slotted and unslotted. Lift, drag and centre of pressure are plotted for various incidence for the front slot and slotted rear flap. The results show the extra lift coefficient obtained by means of the slot, and the advantage of the front slot and slotted rear flap for control purposes.

#### ON THE CALCULATION OF STRESSES IN THE HULLS OF RIGID AIRSHIPS.

By R. V. SOUTHWELL, F.R.S., A.F.R.Ae.S. (R. 38 Memorial Prize Essay, 1926).

R. & M. No. 1057 (49 pages and 12 diagrams). November, 1926. Price 1s. 9d. net.

This paper provides a comprehensive summary of methods for the calculation of stresses in the hulls of rigid airships. The stress work was commenced as a result of the enquiry by the Accidents Investigation Sub-Committee into the accident to H.M. Airship R. 38. A special Airship Stressing Panel was appointed on their recommendation and reported, outlining a method of stressing, in R. & M. 800.\* A practical application of the Panel's methods was made by Lieut.-Col. V. C. Richmond in a paper read before the International Air Congress, 1923.

The author of the present essay has written a number of papers on stressing work which have been published as R. & M.

\* R. & M. 800. Report of the Airship Stressing Panel.

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Nos. 737,† 790,‡ 791§, 819,|| and 821.¶ Other experience has been gained by him in co-operation with the Cardington Staff during the designing of R. 101.

In the main the methods outlined by the Airship Stressing Panel have been substantiated, but certain additional matters have needed treatment, some of which have been met by what is called by the author "The Device of the Separate Panel." This device and methods of stressing a complete ring are described in the present report, which also briefly summarises the conclusions reached by other workers.

† R. & M. 737. On the determination of the stresses in braced frameworks. Part I. The effects of axial loading, flexure and torsion upon a framework of uniform rectangular cross-section.—R. V. Southwell.

‡ R. & M. 790. On the determination of the stresses in braced frameworks. Part II. The effect of shear upon a framework of uniform rectangular cross-section.—R. V. Southwell.

§ R. & M. 791. On the determination of the stresses in braced frameworks. Part III. The effect of axial loading, torsion, flexure and shear upon a braced tube of any uniform cross-section.—R. V. Southwell.

|| R. & M. 819. On the determination of the stresses in braced frameworks. Part IV. The effects of axial loading, flexure, torsion and shear upon a tubular framework with taper.—R. V. Southwell.

¶ R. & M. 821. On Castiglione's theorem of least work, and the principle of St. Venant.—R. V. Southwell.

#### D. M. SMITH'S METHOD FOR THE DETERMINATION OF THE TRANSVERSE FREQUENCIES OF VIBRATION OF UNIFORM BEAMS.

By T. W. K. CLARKE, B.A., AND V. M. FAULKNER, B.Sc.  
Presented by the Director of Scientific Research.

R. & M. No. 1058 (Ae. 240) (9 pages and 3 diagrams). April, 1926. Price 9d. net.

The nomographic method described (reproduced from an article in *Engineering*, December 25, 1925, page 808, by David M. Smith, B.Sc.) can be used for finding, by a simple tabular process, the frequencies of vibration of uniform beams of any number of spans, and under any conditions of support ranging from simple to rigid and with or without overhanging ends.

The formulæ and several illustrative examples are given in the present paper.

#### FLYING POSITIONS OF CONTROL SURFACES OF BRISTOL FIGHTER.

By Capt. G. T. R. HILL, M.C., M.Sc., A.F.R.A.S.

R. & M. No. 1060 (Ae. 243) (6 pages and 8 diagrams). May, 1926. Price 6d. net.

The object of the experiments described in this report was to determine the positions of the control surfaces of a Bristol Fighter under varying conditions of flight, as this aeroplane has been taken as a standard for research purposes. At a height of 6,000 ft., the positions of the control surfaces have been measured throughout the whole range of speed for three different settings of the throttle, both in straight flight and on steady turns up to 30° bank. The various control positions for the different flights are shown in the number of curves for the same airspeed.

The aeroplane is longitudinally unstable throughout most of its speed range whatever the power output of the engine. Except near the stalling point, the variation of control position with engine power is greater than the variation with speed, while the positions required when on a 30° bank are not greatly different from those observed in straight flight at the same speed and engine power.

#### ON THE CONTRACTION OF THE SLIPSTREAM OF AN AIRSCREW.

By H. GLAUERT, M.A. Presented by the Director of Scientific Research.

R. & M. No. 1067. (Ae. 249) (11 pages and 3 diagrams). February, 1926. Price 6d. net.

The development of airscrew theory depends on the determination of the induced velocity of the trailing vortex system which forms the slipstream and in the vortex theory this induced velocity is calculated on the assumption that the contraction of the slipstream can be neglected.

An attempt has been made to extend the theory by taking account of the contraction of the slipstream, which is repre-

sented by a close succession of vortex rings. By a method of successive approximation a modified theory has been developed which is represented by the characteristic curve of Fig. 3.

The form of the characteristic curve obtained from the modified theory is in close agreement with the straight lines

$$\frac{1}{f} = \frac{1}{F} \pm 2.$$

The solution is consistent with the momentum equation, but the ratio of the induced velocity in the wake to that in the airscrew disc no longer has the constant value 2. The ratio is less than 2 for a propeller and greater than 2 for a windmill.

#### THE FULL SCALE DETERMINATION OF THE LATERAL RESISTANCE DERIVATIVES OF A BRISTOL FIGHTER AEROPLANE. PART II.—THE DETERMINATION OF THE RATE OF TURN DERIVATIVES.

By H. M. GARNER, M.A.

R. & M. No. 1068 (Ae. 250) (4 pages). September, 1926. Price 3d. net.

The determination of the sideslip derivatives of a Bristol Fighter is described in R. & M. 987.\* The present report deals with the determination of the rate of turn derivatives.

Glides were carried out at an incidence of 10° with steady turns to the right and left, and measurements made of aileron angles, rudder angle, sideslip and rate of turn. From these measurements the rolling and yawing moments due to turn are calculated.

The values of the rolling and yawing moments agree quite well with the model values determined in R. & M. 932, Section 2.

A scheme has been devised for the determination of the rate of roll derivatives and is now proceeding.

\* R. & M. 987. The full scale determination of the lateral resistance derivatives of a Bristol Fighter aeroplane, by H. M. Garner, M.A., and S. B. Gates, B.A.

These Reports are published by His Majesty's Stationery Office, London, and may be purchased directly from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, W.C.2; 28, Abingdon Street, London, S.W.1; York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; or 120, George Street, Edinburgh; or through any bookseller.

#### SUMMARIES OF TECHNICAL REPORTS OF THE RIJKS-STUDIEDIENST VOOR DE LUCHTVAART, AMSTERDAM.

REPORT A. 129. EXPERIMENTS ON THE VELOCITY DISTRIBUTION IN THE BOUNDARY LAYER OF AN AEROFOIL WITH ROTARY CYLINDER.

Earlier experiments have shown (Reports A. 96 and A. 105) that a rotary cylinder accommodated in an aerofoil may have an important influence on the flow. To check the explanation of this phenomenon given there, a closer investigation of the flow was made.

The velocity in several points in the proximity of the surface of the model was measured with a hot-wire anemometer. Fig. 1 shows the general arrangement of the tests. The pressure distribution on the upper surface of the model has been measured in the ordinary way (Fig. 2).

At all tests the angle of incidence was 0°, the air speed at a considerable distance from the model 5.44 m./sec. (17.8 ft./sec.). The position of the measuring points is given in the sketches, which are joined to the figures. The distance *ij* between the anemometer and the aerofoil surface was 0.05 cm., gradually increased to 5 cm., measured along the normal to the chord. In all points measurements were made with the cylinder rotating (A) and stopped (B), and then in the points III—VII, also with cylinder stopped and the gap between cylinder and fixed part filled up and carefully smoothed. The number of revolutions per minute of the cylinder was 9,600, so the ratio peripheral speed: air speed was 3.42.

The pressure distribution on the upper surface has been determined also for the cases A, B and C at an air speed of 5.44 m./sec., the cylinder running at 9,600 r.p.m.

The results of the velocity measurements are given in Table I and Figs. 3 to 8. In the Figs. 3 to 5 they are plotted together for all measuring points on the upper surface for each arrangement of the model. Figs. 6 and 7 show a comparison of the model with cylinder rotating and at rest (A and C), and also that of the model with cylinder at rest and slot open or closed (B and C). Fig. 8 shows the results for both points on the lower surface. The results of the pressure measurements are represented in Table II and Fig. 9. In the latter the pressures have been divided by the dynamic pressure before plotting.

The results confirm the surmise made in Report A. 105 that an important momentum is imparted by the cylinder to the air in the immediate proximity of the surface, but that the direct action is confined to a very thin layer.



# CIVIL AVIATION

Annual Report from April 1 to December 31, 1926.

IN the Annual Report on the Progress of Civil Aviation just published, a change from previous Reports has been made in that the period covered is the calendar year, instead of the financial year; the present Report, therefore, deals with the nine months April to December, 1926. Future Reports, it is stated, will cover the calendar year.

As before, the Report is divided into two parts—I, dealing with general and British Empire aviation, and II aviation in foreign countries. Reference is first made to relations with foreign countries and the International Commission for Air Navigation, and the Imperial Conference of 1926. Regarding the former, it states that the amendment of Article 5 of the Convention (flight over the territory of a contracting State by aircraft of a non-contracting State) became effective on December 14, on the deposit of the outstanding ratification of the amending protocol by the Kingdom of the Serbs, Croats and Slovenes. The amendment of Article 34 (equality in voting on the International Commission) similarly became effective on the same date.

As regards the Imperial Conference, it will be unnecessary for us to refer to this subject here, as this was dealt with in detail in *FLIGHT* at the time (November 4 and November 25, 1926).

Of the information that follows it will only be possible for us to publish here a *résumé* thereof, and those of our readers who desire fuller details are advised to obtain a copy of the Report from His Majesty's Stationery Office, price 1s. 3d. net.

## Commercial Air Services

Referring to Imperial Airways, Ltd., the Report states that the following services were operated by the company in Europe during the period under review: London-Paris; London-Paris-Basle-Zurich; London-Ostend; London-Brussels-Cologne; London-Amsterdam (to October 15); and Southampton-Channel Islands. Occasional flights were made from Amsterdam to Hanover and Berlin, and Brussels and Cologne. By arrangement with Luft Hansa that company took over the operation of the London-Amsterdam service on October 15.

During the year Imperial Airways have completed a total horse-power-mileage of 549,139,440, and a mileage of 732,980. In addition, about 46,000 miles were flown on special flights, apart from the subsidised services.

A committee of technical representatives of the Air Ministry and Imperial Airways has, continues the Report, been set up to study the problems of reducing costs, and the Committee has already begun a detailed examination of a number of questions which urgently call for solution.

Reference is made to the Imperial Airways Egypt-India service, but there is nothing of importance here to add to what has already appeared in *FLIGHT*.

A new company, it is stated, has been formed under the name "Air Taxis, Ltd.," to conduct special charter flying, similar to that carried out by the De Havilland Hire Service. This new company will be stationed at Stag Lane, and will engage in air photography as well as taxi work.

Referring to civil aviation during the general strike, the Report states that the resources of civil aviation were drawn upon to assist in maintaining communications. The regular cross-Channel air services were unaffected and furnished a link with the Continent when other regular services had stopped. Other civil aircraft, including the "Moth" aeroplanes belonging to light aeroplane clubs, were organised for the distribution of newspapers and mails and for similar duties.

In all, 37 machines and 45 pilots were so employed.

Regarding the Savage Skywriting Company, it is stated that this company has reconditioned its fleet (12 machines) in the United Kingdom, and has arranged for a large campaign embracing three countries of Central Europe, and for introducing skywriting into Australia and South Africa. Major Savage, Managing Director of the Company, has also carried out experiments on the problem of the aerial spraying of crops, which promise, by means of a new method, to yield considerable improvement in the efficiency of the spraying, enabling a much greater area to be sprayed during each flight.

## Air Survey and Photography

Dealing with this important branch of aviation, the Report says the period under review has witnessed a considerable

awakening of interest in the commercial possibilities of air survey, and evidence is not lacking that the value of the services rendered is such that air survey will have no difficulty in standing on its own feet. The Air Survey Committee has continued to be of assistance in giving advice to commercial companies engaged in air survey, and that a report on "Flying for Air Survey Photography" has been prepared.

The Report also refers to the Aircraft Operating Co.'s expedition to Northern Rhodesia, and adds that Aero Films, Ltd., have continued to expand their programme of commercial photography in this country; 2,500 photographs were taken during the period of nine months, including the photography of 15 sq. miles of industrial country for the Rural District Council of Doncaster.

The Air Survey Co., Ltd., have expanded their organisation in the east—operations being carried out in Sarawak (Rejang Delta), Federated Malay States, and Chittagong (Bengal), while the company are devoting attention also to the problem of air transport in the region of the Straits Settlements. The Central Airphoto Co., Ltd., and the Surrey Flying Services, Ltd., have also continued to carry out air photography for industrial and advertising purposes.

## Light Aeroplane Clubs and Private Flying

The five Light Aeroplane Clubs approved under the Air Ministry scheme have continued the development of their activities during the period under review, while a sixth club, the Hampshire Aeroplane Club, was approved in May, 1926. The total membership of the Clubs as at December 31 was 1,058; 97 members held pilots' licences, of whom 55 qualified on Club aircraft. Further figures relating to the activities of the Clubs are given in a table, which we reproduce on page 261.

Apart from the six officially-assisted Clubs, six have been started independently, including the Private Owners' Club. The number of aircraft registered in the names of Clubs and "private" owners is increasing steadily; on December 31, 1926, the total was 58, of which 32 were light aeroplanes.

## University Squadrons and Training of Reserve Officers

The establishment of University Air Squadrons at Oxford and Cambridge has, states the Report, importance to civil aviation not less than to the Royal Air Force, since these squadrons are intended to assist in spreading a knowledge of aeronautics among members of the Universities who will follow a non-military calling equally well with those who will adopt a Service career. The present membership of the squadrons is 50 each.

The flying training of officers of the R.A.F. Reserve has continued at the five civil schools, 362 Courses having been completed, between April-Dec., as follows:—De Havilland, 88; Bristol, 64; Beardmore, 64; Armstrong Whitworth, 57; North Sea Aerial and General Transport, 63 (twin-engine aeroplanes) and 26 (seaplanes). *Ab initio* training has continued at the two schools engaged on this work, 31 courses being completed during the same period as follows:—De Havilland, 14; Bristol, 17.

## Long-Distance Flights and Air Racing

The report contains an account of the Air Minister's flight to India, inaugurating the Imperial Airways Egypt-India service, but this again has already been fully dealt with in *FLIGHT* and needs no further reference here. Reference is also made to other well-known long-distance flights, such as Sir Alan Cobham's flight to Australia and back, Col. Minchin's Croydon-Cairo-Croydon, and the light aeroplane flight to India by Mr. Stack and Mr. Leete.

In referring to air races and competitions, the report states that interest in air racing throughout the country has been aroused by the meetings organised by the light aeroplane clubs, and that proposals are being considered by the Royal Aero Club and other parties concerned for a considerably larger programme of air races in 1927, when it is hoped that a still stronger impetus will be given to the movement for raising air racing to a leading place among national sports.

## Airships

On the subject of airships, the report mentions that the analysis of the pressure-plotting experiments with R.33 was completed in the summer of 1926, and showed that the full-scale results agreed generally with those obtained in

model experiments in a wind tunnel. This result means that the designers of the two new airships, R.100 and R.101, can now accept with much greater confidence as a basis of design the calculations of aerodynamic forces based on experiments in the wind tunnel.

A complete section of R.101 (Cardington) was erected in July and submitted to stringent tests, with satisfactory results. The way is now clear, the report adds, for construction to proceed in accordance with the results obtained. The construction of R.100 by the Airship Guarantee Co. has been proceeding at Howden; it is hoped that both airships will undergo their flying trials in 1928.

Of other matters relating to airships, the report refers to the experiments with R.33 in carrying and releasing aircraft (see *FLIGHT*, October 28, 1926), and to the decision of the Dominion of Canada and the Union of South Africa to erect mooring masts.

#### Licences, etc., and Ground Organisation

The report includes a table showing the licences and certificates issued during the nine months under review and also for the whole of 1926. During the period under review the number of pilots' licences issued shows a marked increase over last year, due to a considerable extent to licences being obtained by members of light 'plane clubs. It is noted that the medical examination required for the renewal of Class "A" pilot's licence has been abolished. Of 268 aeroplanes and seaplanes registered on December 31 last, 216 machines, totalling 50,355 normal horse-power, were in civil employment, and the remainder were experimental machines of military types in the hands of constructors.

Under the heading of "Ground Organisation," brief mention is made of the air ports and landing grounds in use on the cross-Channel and Cairo-Karachi routes. The question of night flying equipment is also dealt with, as regards which it is stated that, while no important changes have taken place during the period under review, it is becoming more and more evident that the Néon form of beacon will prove the most suitable for air navigation. Experiments with, and comparative tests of, different types of Néon tubes are being carried out.

Mention is also made of the modifications being carried out at Croydon regarding the lighting arrangements (sun valve control for obstruction lights, mobile floodlight unit, etc.), and it is further stated that work is in progress on the unmasking on the landward side of the marine lights at Dungeness and South Foreland, for the use of aircraft.

On the subject of wireless the Report says that owing to the steady increase in air traffic in Europe, the use of radio-telephony on civil aircraft, as from January 1 this year, is limited to aircraft carrying 5-9 persons, including crew; aircraft carrying 10 or more will use wireless telegraphy and a special operator will be carried. Reference is also made to the construction of new wireless stations at Croydon and Lympne, and to the organisation of a chain of wireless stations between Cairo and Karachi. It is further stated that a sub-committee of the Imperial Communications Committee of the Committee of Imperial Defence, has completed draft British Technical Wireless Regulations (October, 1926), which have been approved in draft form.

Regarding Meteorology, the Report states that the general arrangements for the supply of information for civil aviation remain unchanged, but further improvements have been made in details.

#### Technical Development

Referring to technical development, the Report tells us the past year has been marked by the introduction of aircraft built in accordance with the revised policy of increasing the reserve of engine power available, as a measure for procuring greater safety. The development of metal construction, and methods of protecting metal against corrosion, are steadily proceeding. The improvement of control, the Report continues, is receiving constant attention, but owing to the complex nature of this problem, definite progress is slow; once again reference is made to the "Autogyro," and also to the tailless aircraft. Amongst the types of multi-engined commercial aircraft produced in 1926, the following are mentioned: The Armstrong-Whitworth "Argosy" (3-"Jaguar"); the De Havilland "Hercules" (3-"Jupiter"); and the Handley Page "Hamlet" which is being fitted with two Siddeley "Lynx" engines.

Of machines under construction, mention is made of two large three-engined boat seaplanes of all-metal construction, carrying 15 passengers; a twin-engined boat seaplane for the Channel Islands-Southampton Service; and a special freight-carrying landplane. A new specification is being discussed which covers all available knowledge on commercial

passenger types, and in which it is hoped to make very considerable progress in eliminating noise in the passenger cabin and in minimising the amount of time the aircraft is out of commission, owing to necessary repair and maintenance work.

Regarding engines, we are told experiments are being made to obtain a satisfactory reducing gear for air-cooled radial engines in order to increase the crankshaft speed and, consequently, the power, without detriment to propeller efficiency. Also, a heavy oil engine using compression ignition is now on the test bench and development is actively proceeding on this type of engine.

Concerning other technical matters, mention is made of the Bramson Anti-Stall gear, which has passed into the service trial stage, and as soon as the tests are complete a decision will be made as to whether this device is suitable for civil aircraft in general; also, the Schilovsky-Cooke Turn Indicator has undergone considerable modification, and should prove valuable for night flying.

#### Accidents

Following a few notes on medical services, the Report proceeds to deal fully with the investigation of accidents to civil aircraft. In the space at our disposal, it is impossible to cover all the information given in detail, and here we must refer the reader to the actual Report itself. We will refer, however, to some of the outstanding items concerning this subject. The record of accidents for the period under review, says the Report, is not so satisfactory as that of the previous twelve months, but having regard to the circumstances and nature of the more recent accidents, it may be said that progress towards safety in air transport has been maintained.

Only one serious mishap occurred on the British established air routes. Altogether there were 13 accidents to which the Air Navigation (Investigation of Accidents) Regulations, 1922, were applicable. Eight resulted in loss of life, but only half this number were cases of aeroplane crash, the cause of each of the other fatalities being unprecedented in records of British civil aviation.

With one exception (the case of engine failure over the Channel) each of these accidents to aeroplanes was, in the opinion of the inspector of accidents, due solely to an error of judgment on the part of the pilot concerned. A brief description of the circumstances which led to these accidents is given in the Report.

#### Statistics

As in previous reports, several pages are devoted to tables setting forth the statistics of civil aviation in 1926 and previous years. Space will not permit us publishing these tables, but the following is a summary of the principal facts contained therein.

Table A.—In view of the introduction of statistics of air transport passenger-mileage and ton-mileage (Table B), it has been found possible to simplify and improve Part I of Table A, relating to air transport flying. The columns for machine flights and machine mileage remain unchanged, and are comparable for all the independent periods shown. The column for passengers carried, however, is not comparable throughout, since the totals quoted for 1925 and 1926 represent the actual numbers of individuals carried instead of, as in previous periods, the numbers of persons carried over each stage of a route. The column for goods carried also differs. The figures in this column for 1925 and 1926 represent the total paying cargo carried, that is, goods, mails and excess baggage. Prior to 1925, the totals do not include excess baggage, nor do they include a small amount of goods carried between aerodromes on the Continent.

A comparison of the figures for 1925 and 1926 (on the revised basis) shows the large increase in traffic carried by Imperial Airways, Ltd., in 1926. 16,775 passengers and 679 tons of goods were carried in 1926, as against 11,193 passengers and 550 tons of goods in 1925. The mileage flown was again less than in the previous year as a consequence of the replacement of single-engined aircraft by twin and three-engined machines of greater carrying capacity.

To assist comparison of passenger traffic it may be mentioned that the figures for passengers "by stages" in 1925 and 1926 were 14,068 and 20,367 respectively, and that the number of individual passengers in 1926—16,775—was therefore higher than the number of passengers "by stages" in 1925.

Other flying for hire, mainly joy riding, in Part II of the table, was once more greater in amount than in any previous year, with 215,000 miles flown and 81,909 passengers carried. So far as reported, the total number of persons who, since 1919, have been taken up as passengers in this branch of civil



flying, now amounts to 390,116; many others have not been reported.

**Table B.**—This table, an addition to those given in previous reports, sets out in detail the traffic conducted by Imperial Airways, Ltd., in units of horse-power-miles, passenger-miles, and ton-miles. The progressive improvement in the company's operations is clearly shown. In 1926, as compared with 1925, passenger-mileage increased by 41.6 per cent., and goods ton-mileage by 7.7 per cent., whilst total ton-mileage increased by 28.6 per cent., and horse-power mileage (miles flown  $\times$  engine power) by 21.4 per cent.

**Table C** compares traffic carried across the Channel by British aircraft with that carried by foreign aircraft, and indicates that the British share of the traffic, which had declined to 51 per cent. in 1925 when the British fleet was inadequate, is rising again to its former level: it stands at 61 per cent. for 1926. The total number of passengers carried by British and foreign air lines to and from the Continent now amounts to 109,634 in five years and four months.

**Tables D (1) and (2)** show respectively the value of ordinary merchandise and of bullion and gold and silver coin imported and exported by air. It is interesting to note that imports of ordinary goods in 1926 were smaller than in 1925, but that exports were substantially larger and the total amount was therefore again higher than in any previous year. The carriage of bullion and gold and silver coin by air appears to be well established. In 1925, the value carried was £10,040,399, and in 1926, £8,283,498. Exports formed the bulk of this traffic.

**Table E.**—The efficiency of Imperial Airways' services is now given not only on the basis of the flights commenced, as in previous reports, but also in relation to the flights scheduled. In 1926 the flights scheduled numbered 4,374, of which 374 were cancelled, 3,715 (85 per cent.) were completed without interruption, and 3,954 (90 per cent.) were completed with or without interruption. This result was a considerable improvement on the previous periods included in the table. Of the 4,000 flights commenced in 1926, the proportion completed with or without interruption was 99 per cent.

**Table F** analyses the causes of involuntary landings on the established air routes. As in 1924 and 1925, the factor responsible for about 50 per cent. of cases of involuntary landings was bad weather, whilst engine or installation failure accounted for 33 per cent. of cases and other reasons for the balance. Since involuntary landings are roughly trebled in winter as compared with summer, owing chiefly to fog, the large improvement in reliability that will be gained from a solution of the fog problem is evident.

**Table G.**—Accidents in commercial aviation. In view of the development of private flying it is desirable to point out that this table relates to air transport and other flying for hire. Tabular statistics of accidents to aircraft not carrying paying passengers, including club aircraft, have not been compiled, but particulars of such accidents are included elsewhere in the report (pages 27-28).

For the second consecutive year British air transport has a record of no accidents resulting in death or injury, and the accident rate since the services began in 1919 is therefore still further improved. A total distance of 5,271,000 miles has now been flown with only four accidents causing the death of passengers. This is equivalent to one such accident in a distance flown corresponding to 52 times round the world at the equator.

One accident to a fare-paying passenger occurred in other flying for hire. This was the first fatality for five years in "joy ride" flying and was due to the passenger falling out of the machine.

**Table H.**—This table, which we publish on p. 261, has been added to illustrate the membership and work of the officially-assisted light aeroplane clubs. The total amount of flying carried out up to the end of 1926 amounted to 12,551 flights and 5,085 hours.

### The Dominions, India, and Colonies

The final section of Part I is devoted to civil aviation in the Dominions, India, and Colonies.

**Australia.**—The three Australian air services, it is stated, have continued to give proofs of their safety and reliability, and of their remarkable value in the development of the areas which they serve. Since their inception they have covered, on regular flights alone, a total distance of about 1,338,000 miles without serious accident apart from one which occurred on a preliminary flight over the first route. A large amount of work equally free from accident, has also been done. A regularity of 100 per cent. is maintained practically con-

tinuously. Statistics of the past year's traffic are given in a table which shows the following:—Total number of flights, 3,267; miles flown, 417,964; passengers carried, 3,763; letters (to Nov. 31), 264,735; freight, 65,346 lbs. The Western Australian Airways contract (Perth-Derby) has been renewed for a further period of 3 years, the subsidy being reduced to 3s. 4d. for the first year of the new period.

Traffic has so increased between Perth and Carnarvon that the company proposes to institute a second service in each direction, early in 1927, for which no additional subsidy will be paid.

"**Quantas**" (Charleville-Cloncurry-Camooweal) completed four years of contract flying on November 1, 1926, and intends to organise a daily service from Brisbane to Toowoomba without subsidy.

The third service, Adelaide-Cootamundra with branches from Broken Hill to Mildura and Hay to Melbourne, has made good headway since reorganised in July, 1925.

In anticipation of a call for tenders for the operation of a seaplane service between Victoria and Launceston, Tasmania, a new company—Tasmanian Air Services, Ltd., has been formed at Melbourne. (The provision of a subsidy for this service is, it appears, still "under consideration.")

The light aeroplane club movement, says the report, has taken a firm root in Australia, clubs having been formed at Sydney, Melbourne, one in South Australia, and another organised by the Geelong Aero Club.

**Canada.**—The development of Canadian civil aviation has continued along the lines already described in previous reports—the principal operations being the protection of forests against fire, air survey and forest type sketching.

The total civil aircraft registered in Canada numbered 44; civil pilots numbered 38; hours flown by civil aircraft totalled 5,860. The Royal Canadian Air Force employed approximately 34 aircraft and carried out 2,278 hours of flying in civil operations.

**South Africa.**—There has been a considerable awakening of interest in aviation during the past year. The Aero Club has been re-established, and has begun an energetic campaign with the object of attracting public attention to the importance of aviation to the Union. One of the aims of the Club is to organise a light aeroplane section. The offer of £8,000 as a Government subsidy for an air transport service is still maintained, and several schemes have been under discussion. The advantages of a service between Johannesburg and Durban are also recognised and a company is in course of formation with a view to opening up this route.

**India.**—Towards the end of the year a memorandum was presented by the Indian Air Board to the Government of India reviewing the present situation of civil aviation, and giving the views of the Board as to the steps that should be taken for the encouragement and assistance of civil air services with due regard to Indian interests. Among recommendations of a general character there were four upon which special emphasis was laid: (a) that the Government should adopt the principle of subsidies for the operation of air transport in its early stages; (b) that the Government should be responsible for the provision of the necessary aerodromes and ground organisation as is the practice in other countries; (c) that the interest and support of Indians should be elicited by the investment of Indian capital in commercial air services and the training and employment of young Indian men in them; and (d) that a Directorate of Civil Aviation should be established under a Director, whose services would be obtained from the Air Ministry. A final recommendation urged that action should be taken speedily.

**Kenya, Uganda and the Sudan.**—Particulars are given of the experimental air service between Khartoum and Kisumu, which, as our readers are aware, started this year and temporarily closed down owing to the accident to the machine.

**West Indies.**—The consideration of the opportunities for the operation of civil air transport in the neighbourhood of the West Indies was referred to a committee appointed in the Air Ministry for the purpose. They have reported that a service throughout the West Indies is commercially impracticable at present owing to the comparatively small volume of the traffic available and the consequential necessity for a large measure of financial assistance. Opportunities exist, however, for the establishment of certain local services.

This concludes Part I of the Report, and Part II, dealing with foreign countries, must, owing to lack of space, be reserved for a future occasion, when we hope to give a *résumé* of the more interesting items of interest contained therein.



## THE HAMPSHIRE AIR PAGEANT

THIS is the next interesting air event, and it takes place on Sunday, May 15. As the time is so short, all intending competitors are urged to enter as soon as possible, sending their entry forms with a guinea for each event entered to Flt.-Lt. C. Crawford, R.A.F., Fiveways, Lee-on-Solent, by noon on May 2. These entrance fees will be returned to all starters. Late entries will be received after this and up till noon on May 13, but they must be accompanied by a fee of five guineas for each machine entered in each event instead of one, and they will not be returnable. Entries must be at Hamble Aerodrome not later than noon on Sunday, May 15, for verification by the officials, and there will be shed accommodation for light aeroplanes free of charge from May 14-16, whilst every endeavour will be made to house other aircraft on receipt of previous notice. There were originally five events, but the fifth, the Seaplane Handicap Race, has been postponed until the autumn at the request of several intending competitors. The first event will be the "President's Cup Race," which is a handicap race open to any aircraft with an engine or engines aggregating not more than 100 h.p. and piloted by a member of any British Aero Club. The course will be 33 miles, flown in three circuits, and the first prize, "The President's Challenge Cup," with £50, has been presented by the Rt. Hon. Lord Louis Mountbatten. The second prize is £20 and the third £10. The next event, "The Morris Open Handicap," is open to all comers, the course being 30 miles. The first prize is "The Morris Challenge Cup," with £100, presented by Mr. W. R. Morris, the motor car manufacturer, the second £30, and the third £15. The third event is the "Wakefield Light Aeroplane Handicap," open to any light aeroplane, the course being 22 miles, flown in two circuits. The first prize is "The Wakefield Challenge Cup" and £50, presented by Sir Charles Wakefield, the second prize £20, and the third £10. The last event is the "Light Aeroplane Utility Race," which is limited to one light aeroplane from each of the six subsidised clubs, although open to any pilot and passenger if both are members of a club. The conditions of this race are that each competitor will wheel his machine

out of its shed with the aid of his passenger, unfold the wings, start up the engine, fly round the course with his passenger, return and re-house the machine. A qualified inspector, appointed by the Stewards, will certify each machine after erection and prior to flight. The first prize for this event has been presented by the editor of FLIGHT, and is nominated as the "Flight" Cup, together with the "Stormograph" which has been presented by Short and Mason, Ltd. The second prize is a Time-Of-Trip Clock, presented by S. Smith and Sons (M.A.), Ltd.

That will complete the racing events. For the purpose of this meeting the light aeroplane has been designated as one fitted with an engine or engines not exceeding 5,000 c.c., so that the "Cirrus Mk. I and II" and the "Genet" engines will qualify. The three challenge cups will be held by the entrants of winning aircraft for one year and any of them may be won outright by three successive victories. Third prizes will only be awarded if there are six or more starters. Competitors must possess a third part insurance policy for each machine entered, and it is as well for them to understand, as time is so short, that some facts about their machines must be given on their entry form which they may not readily know. For instance, span, chord and total area of wings (including ailerons), weight of each machine fully loaded as for the race, and date of construction. The design, number and diameter of the airscrew are required, with the revolutions per minute of engine at the top speed of the machine near the ground and when fitted with the airscrew stated. As regards the engines, the ordinary details from the engine log book are all that is necessary. If the machines have done any previous racing any alterations made subsequently in the design or any deviation made from the standard type, if it has not competed, must be stated, that is, in the streamlining of fittings, alterations to chassis, wings, body or tail unit.

In FLIGHT for February 24, we gave other necessary particulars of this pageant, which is being organised by the Hampshire Aeroplane Club, and our readers will find there the travelling facilities arranged and the full nature of the day's programme.

## PERSONALS

### Married

The marriage arranged between Sqdn.-Ldr. WYNDHAM BROOKES FARRINGTON, D.S.O., and Miss VIOLET MURIEL NEVILLE took place at All Souls' Church, Langham Place, on Thursday, April 21.

DUDLEY HUMPHREYS, R.A.F., son of Mr. and Mrs. C. J. Humphreys, of Bournemouth, was married on April 23 at St. Andrew's, Limsfield, to MARGERY, only daughter of Mr. and Mrs. J. Fox Lowe, of Limsfield, and grand-daughter of the late Rev. Canon Lowe, of Haltwhistle, Northumberland.

The wedding of FLIGHT-LIEUT. PHILIP STUART JACKSON-TAYLOR, R.A.F., and Miss ELISABETH SERENA COOKE-YARBOROUGH, youngest daughter of Canon and Mrs. J. Cooke-Yarborough, took place on Thursday, the 21st inst.

CYRIL RUTHERFORD MASON, R.A.F., only son of the late Thomas Mason and Mrs. Mason, of Ilfracombe, was married on April 19 at Lingfield Parish Church, to ALICE, third daughter of Mr. and Mrs. HERBERT LOCKE, of Lingfield.

SQUADRON-LEADER BARRY FITZGERALD MOORE, R.A.F., son of the late W. R. F. Moore, M.I.C.E., of Melbourne, and

Mrs. Moore, was married at St. Paul's Church, Canterbury, on April 2, to DOROTHY GERTRUDE, elder daughter of R. S. N. FARO and Mrs. FARO, The Old Forge House, Canterbury.

On April 23, at St. George's Church, Hanover Square, GEOFFREY CHARLES STEMP, R.A.F., was married to FRIEDA, eldest daughter of Mr. and Mrs. J. GREVENER, of Streatham Common, S.W.

### To be Married

The marriage between Flight-Lieut. CHARLES LESLIE COX and Miss ANNE BRERETON will take place on April 28 at the Savoy Chapel.

The marriage arranged between CAPT. A. S. CUNNINGHAM REID, D.F.C., M.P., and Miss ASHLEY will take place on Thursday, May 12, at St. Margaret's, Westminster, at 2.15 p.m.

A marriage has been arranged, and will take place on June 11, at St. Martin-in-the-Fields, between REGINALD CLARENCE PRESLAND, Flying Officer, R.A.F., late R.N.A.S., youngest son of Mr. and Mrs. W. H. J. Presland, of Walthamstow, Essex, and EILEEN, eldest daughter of Mr. and Mrs. P. MACCALLUM, of Beckenham, Kent.

### Mr. Stack on his Flight to India

THE attention of the Editor has been called to the report, published in last week's issue of FLIGHT, of the little impromptu after-dinner account of his and Leete's flight to India, which Mr. Stack gave at the Inst. of Aeronautical Engineers on April 8. It would appear that the report was so worded that it might convey quite an erroneous impression, and we take this opportunity of correcting any misunderstanding that may have arisen. In relating a little scene in the mess of one of the Italian air stations, Mr. Stack quoted a single instance which had appealed to the Northern sense of humour of the two air travellers, and told it in such an amusing manner that it could not possibly have given offence to anyone. As reported, however, it might be the reverse, and as both Stack and Leete have the greatest admiration for the Italian aviators, who showered kindness upon them

in every way, they are naturally concerned at Mr. Stack's remarks having been wrongly interpreted.

Again, in quoting Mr. Stack's remarks concerning the difficulty of finding Malta, and Sir Roger Keyes' amusement at the two pilots finding their way with the crude equipment available, Mr. Stack did not, as reported, say that the prevailing tendency was "for local pilots to miss the island," but that until the advent of directional wireless, pilots went out and had been known to miss the island upon returning, a very easy thing to do under the circumstances, particularly in poor visibility. We sincerely regret that such a misleading—however innocent—report should have been published in FLIGHT, and extend our apologies not only to Mr. Stack but also to anyone to whom the report may have reference. Mr. Stack is far too much of a sportsman to have been capable of such a *faux pas* as the report may have attributed to him.

# THE ROYAL AIR FORCE

London Gazette, April 19, 1927.

## General Duties Branch

R. G. Forbes is granted a short service commn. as a Pilot Officer, on probation, with effect from and with seny. of April 6. The following Pilot Officers are promoted to rank of Flying Officer:—E. G. Hordern; Jan. 30. T. K. Merrett, J. N. Young; Feb. 18. H. A. Howes, T. O'N. East; March 12. E. J. George; March 18.

The following are transferred to the Reserve, Class C (April 20):—*Flight-Lieutenant* H. J. T. Russell. *Flying Officers* B. H. Cook, R. V. Weeks.

Flying Officer H. W. Foote resigns his permanent commn.; April 9. Pilot Officer W. I. N. Strong is placed on the retired list on account of ill-health; April 20.

## Stores Branch

Pilot Officer P. J. Mote is promoted to the rank of Flying Officer; March 10.

## Medical Branch

The following Flight-Lieutenants are promoted to the rank of Squadron-Leader:—T. R. S. Thompson, M.B.; April 17. R. S. Topham, M.B., D.P.H., D.M.R.E.; April 23.

## Reserve of Air Force Officers

C. S. Dawson is granted a commn. in Class A.A. General Duties Branch, as Pilot Officer, on probation; March 28. The following Pilot Officers, on probation, are confirmed in rank:—J. McA. Allan; Oct. 27, 1926. M. J. Berlyn; April 19. Flying Officer W. J. E. Rodwell is transferred from Class A to Class C; April 14. Flying Officer L. D. Hamblin relinquishes his commn. on completion of service; March 18.

## AUXILIARY AIR FORCE

### General Duties Branch

The following to be Pilot Officer:—No. 605 County of Warwick (Bombing) Squadron.—K. D. Foster; April 19.

### Princess Mary's R.A.F. Nursing Service

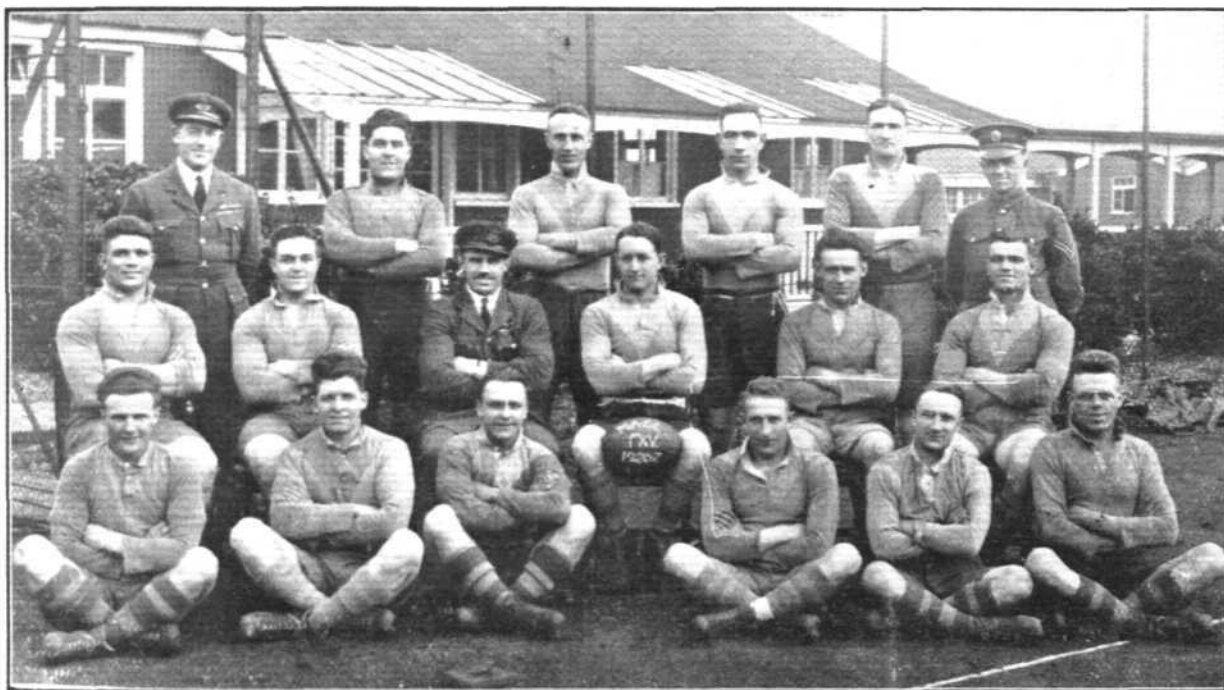
Senior Sister Miss C. E. Jenkins is placed on the retired list on account of ill-health; April 20.

## ROYAL AIR FORCE (FELIXSTOWE) RUGBY FOOTBALL CLUB FIRST FIFTEEN

THE Felixstowe airmen have had a very successful Rugger season. Out of 25 games played, 17 have been won, with a total of 376 points for and 156 points against, including games played in the Royal Air Force Inter-Unit Cup Competition. In this competition they reached the final round, and met Worthingdown at Uxbridge on March 19. Worthingdown proved to have much better three-quarters, and won by four goals and a try (23 points) to nil. However, Felixstowe put up a good game, and deserve credit for being the first of the Coastal Area units to reach the final, and as the Coastal Area unit to get farthest in the competition, hold the Coastal Area Rugby Cup. L. A. C. Toach has been the most prolific scorer, obtaining over 160 of the points scored, but, owing to injury, he was, unfortunately, unable to play in

toft, won, 16—3; R.A.F., Martlesham, won, 25—0; Shotley, won, 33—3; Colchester, won, 18—11; Guy's Extra "A," lost, 6—21; Lowestoft, won, 17—3; 2nd Leicesters, lost, 0—18; R.A.F., Duxford, won, 13—3; 11th Brigade, R.A., won, 9—0; 2nd Leicesters, won, 55—0; R.A.F., Bircham Newton, won, 27—0; Shotley, lost, 5—6; R.A.F., Northolt, won, 15—8; Colchester, won, 16—0; 2nd Leicesters, won, 34—0; Lowestoft, won, 20—0; Shotley, lost, 9—11; R.A.F., Halton, won, 9—0; Ipswich, lost, 0—9; R.A.F., Sealand, won, 9—0; Shotley, lost, 0—16; Ipswich, draw, 0—0; R.A.F., Worthingdown, lost, 0—23.

*Fixtures, First Fifteen, 1927-28.*—17.9.27, Old Whitgiftians, at Croydon; 24.9.27, Ipswich, at Ipswich; 1.10.27, Norwich, at Felixstowe; 12.10.27,



The Royal Air Force (Felixstowe) Rugby Football Club. First Fifteen Team.

the Cup final. The team has also been strengthened by the inclusion of Flight-Lieut. J. S. Chick, of Harlequins and Hampshire. L. A. C. Rollings was "capped" against the Army, and also played for the R.A.F. against Oxford University, Gloucester, and Civil Service.

Old Whitgiftians were the opponents at the season's opening, and were defeated by 16 points to 13.

A good fixture list has been arranged for next season, although as yet incomplete, and it is hoped that every Saturday will see one of the two R.A.F. teams at home. The season's results and chief fixtures for next season, are given below:—

1926-27.—Old Whitgiftians, won, 16—13; Ipswich, won, 20—3; Lowest-

H.M.S. Ganges, at Shotley; 15.10.27, Old Rutlishians, at Felixstowe; 22.10.27, Colchester, at Colchester; 26.10.27, Guy's Extra "A," at Felixstowe; 5.11.27, R.A.F., Duxford, at Felixstowe; 12.11.27, Old Rutlishians, at Merton; 19.11.27, Ipswich, at Felixstowe; 3.12.27, H.M.S. Ganges, at Felixstowe; 14.1.28, Colchester, at Felixstowe; 18.1.28, Guy's Extra "A," at Honor Oak Park; 21.1.28, R.A.F., Duxford, at Duxford; 25.1.28, H.M.S. Ganges, at Shotley; 11.2.28, Ipswich, at Felixstowe; 18.2.28, H.M.S. Ganges, at Felixstowe; 25.2.28, Norwich, at Norwich; 10.3.28, Ipswich, at Ipswich.

In addition, it is hoped that "the luck of the draw" will again be on Felixstowe's side, as in the 1926-27 season, all the rounds being played at Felixstowe up to the semi-final and final, which are played at Uxbridge.

## R.A.F. Golf

In the R.A.F. Golf Championship, Flying Officer G. R. Beamish beat Sqd.-Ldr. A. Lees in the final at Wentworth, on April 7, by 9 and 8 over 36 holes.

## Royal Air Force Flying Accident

THE Air Ministry regrets to announce that as the result of an accident at Eastchurch, Kent, to a Vickers Virginia machine of No. 9 Squadron, Manston, on April 19, Flying Officer William James Kelly, the pilot of the aircraft, Pilot

Officer John Frederick Dowdeswell, No. 134932 Flight Sergeant Albert George Alderton, and No. 157294 A.C.2. Everett Daniels were killed.

## Saved by Parachute

WHEN carrying out experimental flying in a "Gamecock," Flight-Lieut. D'Arcy A. Greig, D.F.C., of the R.A.F., descended safely in a parachute from a height of 8,000 ft. when his machine got out of control whilst spinning over Kenley Aerodrome on April 22, and crashed.



# ROYAL AERONAUTICAL SOCIETY

(Official Notice.)



WHEN Captain T. N. Stack and Mr. B. S. Leete left England in two "Moth" light planes to fly to India, many people wondered where they would eventually land. Few believed they would ultimately reach their destination together, with unchanged machines and engines.

On January 8, 1927, the "two great sportsmen," as they have been aptly described by Sir Samuel Hoare, arrived at Karachi, and in doing so they laid the foundation stones of the future success of the light aeroplane, and fired with enthusiasm many thousands throughout the world to own their own machines, to become owner-pilots.

The journey from London to Karachi was carried out with very little preparation. Capt. Stack and Mr. Leete had to act as their own pilots and navigators and mechanics, and they could not rely upon petrol dumps and spares along the route, if anything went wrong. Those facts make their flight all the more remarkable however, and they have a story to tell of their wonderful experiences which has been excelled by few pioneer stories.

On Wednesday, May 4, at 6.30 p.m., at the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, Capt. T. N. Stack will relate that story for the first time in public, will recount the difficulties he and his companion encountered and overcame and the adventures with which they met. The lecture by Capt. Stack before the Royal Aeronautical Society should prove as interesting and informative as any of the lectures recently given.

J. LAURENCE PRITCHARD, Secretary.

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## The Imperial "Joy-Rider"

IN connection with our Editorial Comment last week concerning the presence at the Bournemouth Easter Meeting of the three-engined air liner used for "joy-riding," it has been pointed out to us by the Royal Aero Club that the machine in question was sent down by Imperial Airways at the request of the Royal Aero Club, and that the idea was not in the least to make money, but rather to provide propaganda for air travel. In point of fact, owing to the necessity of the machine having frequently to cruise around until the end of a race before it could land, it is more than doubtful whether the experiment paid its way.

The Royal Aero Club holds that the machine did do useful propaganda by showing to thousands of people the ease and certainty with which it took off and alighted, while many hundred people had an opportunity of flying in a modern air liner, many of whom are reported to have since written to express their appreciation, and their determination to travel by air in the future, which is very good hearing indeed and under the conditions—accepting this view—the more we are together—pardon—the more the propaganda is repeated the better for all concerned.

## The Royal Air Force Memorial Fund

THE usual meeting of the Grants Sub-Committee of the Fund was held at Idlesleigh House on April 12. Lieut.-Commander H. E. Perrin was in the Chair, and the other Members of the Committee present were:—Mrs. L. M. K. Pratt-Barlow, O.B.E., Mr. W. S. Field, Squadron-Leader Douglas Iron, O.B.E. The Committee considered in all 11 cases, and made grants to the amount of £341 10s. The next meeting was fixed for May 5, at 2.30 p.m.

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## SIDEWINDS

ZENITH carburettors have always figured in big aviation events, and continue to do so. Two recent successes, with which the name of Zenith is associated, consist of the World's Altitude Record for seaplanes with 1,000 kg. of load, established by Passaleva on a Savoia S.62, and Major Saramento Beires' flight across the South Atlantic in a Dornier-Wal flying boat.

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THE reliability of Scintilla magnetos, which are handled in this country by Scintilla, Ltd., of 331, Euston Road, N.W.1, has effectively been demonstrated by the recent World's Duration Record set up by Bert Acosta and Clarence Chamberlain, who were flying a Wright-Bellanca monoplane fitted with a 400 h.p. Wright engine which was equipped with Scintilla magnetos. A continuous run of 51 hrs. 12 mins. is certainly a severe enough test.

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HAVING severed his connection, of many years' standing, with one of the most prominent firms in the aviation industry, a man with a popular personality is on the look-out for opportunities to act as an independent agent for one or more substantial aircraft firms with a view to pushing their products. We shall be pleased to pass on any enquiries from any parties interested.

## PUBLICATIONS RECEIVED

*The Study of War.*—By Maj.-Gen. Sir George Aston. Longmans, Green & Co., 39, Paternoster Row, London, E.C. Price 10s. 6d. net.

*The Journal of Careers.* Vol. VI. No. 62. March, 1927. Journal of Careers, 61, Conduit Street, London, W.1. Price 1s. 6d.

*Proceedings of the Rugby Engineering Society, Session 1925-26.* Vol. XX. The Rugby Engineering Society, Industrial Engineering Department, B.T.H. Co., Ltd., Rugby. Price 10s. 6d.

*Journal of the American Society of Naval Engineers.* Vol. XXXIX No. 1. February, 1927. American Society of Naval Engineers. Navy Department, Washington, D.C., U.S.A. Price \$1.60.

*Report A 98: Air Resistance of Two Aeroplane Radiators.*

*Report A 129: Experiments on the Velocity Distribution in the Boundary Layer of an Aerofoil with Rotary Cylinder.*

*Report A 130: Discussion of the Results of the Tests on the Boundary Layer of the Aerofoil with Rotating Cylinder.*

*Report V 175: The Influence of the Ribs on the Strength of the Main Plane Spars.*

*Report M 219: Mechanical Properties of some Materials used for the Construction of Aeroplanes.*

Rijks-Studienst voor de Luchtvaart. Amsterdam.

*Land, Sea and Air. Memoirs of Admiral Mark Kerr, R.N.*

Longmans, Green and Co. Price 21s. net.

*Central London from the Air. Air Photo. Map Poster for the Underground Railways.*

Aerofilms, Ltd., Hendon, London, N.W.9.

*Berichte und Abhandlungen der Wissenschaftlichen Gesellschaft für Luftfahrt E.V. (W.G.L.). No. 14. December, 1926.*

R. Oldenbourg, Glückstrasse 8, Munich, Germany. Price M. 16.

*Der Luftschiffbau Schütte-Lanz, 1909-1925. By Dr.-Ing. E. h. J. Schütte.*

R. Oldenbourg, Glückstrasse 8, Munich, Germany. Price M. 16.

*The World's Wings. By W. Jefferson Davis.*

Simmons-Boardman Publishing Co., 34, Victoria Street, London, S.W. Price 10s. 6d.

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## NEW COMPANY REGISTERED

SPEEDHIRE SERVICES, LTD., 27, Regent Street, W.1. Capital £3,000, in 10,000 ordinary shares of 1s. each and 2,500 10 per cent. cumulative preference shares of £1 each. Acquiring business of motor car hirers, travel agents and garage proprietors carried on by G. E. F. Boyes and A. J. G. Styran, and dealers in aeroplanes, etc. First directors: G. E. F. Boyes and Flight-Lieut. A. J. G. Styran, M.C., A.F.C.

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## AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

### APPLIED FOR IN 1925

Published April 28, 1927

29,142. A. J. DAREV. Mechanical device for operation of vanes, propellers, or wings, etc. (268,402.)

32,833. P. R. JACKSON (LAWRENCE SPERRY AIRCRAFT CO., INC.). Devices for launching and landing airplanes. (268,423.)

### APPLIED FOR IN 1926

Published April 28, 1927

1,573. M. A. MAZADE. Stabilisers. (246,472.)

2,944. J. D. BATTEN. Attenuation provision for a flapping-wing aerial machine. (268,488.)

3,700. H. E. S. HOLT. Parachute apparatus. (268,498.)

5,775. A. G. ELLIOTT. Arrangement and installing of aero engines. (268,523.)

25,645. E. MITCHELL. Propellers. (268,668.)

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